

## **The Need for Expansion of the Durban Container Terminal**

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**Abstract:** *The Durban Container Terminal (DCT) is currently the biggest and busiest container terminal in Africa and handles about 2.7-million twenty-foot equivalent units (TEUs) a year (Naicker and Allopi 2015: 24). DCT handles approximately 70% of South Africa's containers and generates 60% of South Africa's revenue (Port of Durban, 2014). The existing Port of Durban is the leading port in the Southern African Development Community (SADC) region and the premiere trade gateway between South-South trade, Far East trade, Europe and USA and East-West Africa regional trade. It occupies a focal point in the Southern Africa transport and logistics chain with 60% of all imports and exports passing through the Port of Durban (Increasing South Africa's Economic Potential: 1). Thus the port assumes a leading role in facilitating economic growth in South Africa. Providing operating capacity ahead of the demand has become an essential element of managing national logistics capability in a fast changing and competitive global economic environment (Urban-Econ (PTY) Ltd 2012). In the South of Africa, ports suffer from insufficient storage spaces and long container dwell time, according to the Port Management Association of Eastern & Southern Africa (PMAESA), which is a regional grouping of ports in the two regions. PMAESA also adds that the ports continue to experience increased traffic and are not well served by access infrastructure (Africa embarks on massive expansion of sea ports, 2015).*

*South Africa is currently proposing a port expansion that will include the deepening and widening of berths 203 to 205 which will allow larger vessels to safely berth, thus increasing the overall economic production gained from the terminal (Urban-Econ (PTY) Ltd 2012). However, this expansion needs to take place urgently as the port is restricted to ships with a carrying capacity of less than 3 500 containers.*

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### **1. INTRODUCTION**

Productive industries (i.e. manufacturing, agriculture and mining) have shown recovery since the 2009 recession; hence exports and imports have recovered and continue to show strong growth placing increasing demand on the port. Volumes of containers handled have increased by 7% on average annually. Berths 203-205 handle 37% of containers and are therefore critical to the port. It is, therefore, evident that the volume of traffic at these berths is increasing. Furthermore, regardless of demand for containers, ship sizes are increasing and will continue to do so into the near future to a point where 3,000-6,000 TEU range ships are phased out and replaced with medium and large sized vessels of 8,000-10,000 TEUs. Currently, the terminal can only accommodate ships up to 9,000 TEUs (not fully laden) at high tide. If an expansion does not occur, Durban Port will be unable to accommodate an increasing number of container ships and, thus, regional competitiveness of KZN will be reduced. In the long term, this reduced competitiveness will be significant and detrimental to trade in the province and will raise cost of exports by incurring an additional feeder service to a port that can handle larger vessel sizes. In addition, vessel sizes have increased since the original terminal was constructed and Berth 203 to 205 cannot therefore safely accommodate fully laden new generation container vessels due to insufficient water depth at these berths. At present these vessels enter and exit the Port partially laden and during the high tide window. This is an unsafe operating condition and the risk exists that vessels could run aground (Urban-Econ (PTY) Ltd 2012).

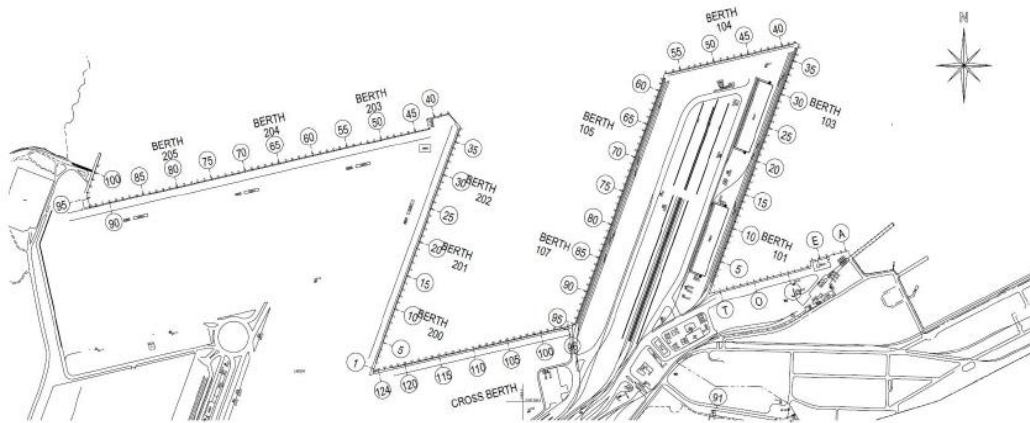
### **2. OBJECTIVES OF THE STUDY (NAICKER AND ALLOPI 2015: 24)**

#### **2.1 The main purpose of this study was:**

- To prove that expansion in the Port of Durban is urgently required

#### **2.2 Study limitations**

This study is based within the vicinity of berth 200-205. Figure 1 shows a detailed layout of the area covered by this study (Naicker and Allopi 2015: 24).



**Fig1.** Detailed Layout of DCT

An average call at pier 2 handles 2300 TEUs (one TEU represents the cargo capacity of a standard intermodal container) according to Transnet Port Terminal (TPT), with a calculated related spend impact of R12.3million through the local and regional economy (Urban-Econ (PTY) Ltd 2012). Also, the global shipping industry has seen the advent of a new generation of shipping vessels that are longer, wider and deeper. In terms of container ships the latest under construction will carry 18 000 TEU's and drafts will be about 15m to 15,5m, compared to the current draft of up to 12,5m. These ships require a deep water port and other facilities which the proposed port will offer. The Port of Durban can accommodate ships with a draft of up to 12,5m. The proposed port will be specifically designed to handle these new generation ships. Transnet uses a 30 year demand forecast on all commodities, to inform its Long Term Planning Framework (LTPF). The demand forecast found that cargo volumes, including containers, are expected to increase threefold or fourfold over the next 30 years. Container volumes are expected to grow from 2.69 million Twenty-foot equivalent unit (TEU) per year in 2010 to between 9 and 12 million TEUs per year by 2040, in Durban alone. If cargo volumes continue to grow at current levels, the existing Port of Durban will run out of capacity by 2019 in spite of the expansion plans. Durban's resources in seaward land are extremely limited and the inability to handle growing cargo volumes will invariably have a knock-on effect on the region's competitiveness and on the national economy.

The following table describes the recorded average vessel and port turnaround time at pier 2 from April to December 2014. It also shows the key performance indicator for each of these. The average Turnaround time for a container vessel calling at Pier 2 is 60 hours (2 and a half days), and the average port turnaround time is 141 hours (just less than 6 days). However, the key performance Indicator for both these is 40 hours (less than 2 days). It is vital for trade in South Africa that the Port is efficient. Efficiency will determine Durban Port's ability to remain competitive as vessel sizes and volumes increase (Urban-Econ (PTY) Ltd 2012).

**Table1.** Average Vessel and Port Turnaround Time

Indicator	April	May	June	July	Aug	Sept	Oct	Nov	Dec	Target
Vessel Turnaround Time	53.0	51.2	54.1	61.8	72.8	70.7	64.1	52.5	55.1	40 Hours
Port Turnaround Time	165.4	131.8	141.1	128.2	183.7	194.3	137.8	87.0	104.1	40 Hours

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The report (Urban-Econ (PTY) Ltd 2012) states that currently, the average call-size is 1,770 moves. Several cranes have been purchased by Transnet in order to increase the number of moves. The crane configuration is currently:

- North Quay (Berths 203-205): 2 Liebherr twin lift cranes, 1 Impsa single lift crane and 7 ZPMC tandem lift cranes = 10(Urban-Econ (PTY) Ltd 2012).
- East Quay (Berths 200+202): 6 Noell single lift cranes (Urban-Econ (PTY) Ltd 2012).
- South Quay Berth (108/9): 4 Liebherr twin lift cranes (Urban-Econ (PTY) Ltd 2012).
- Pier 1 (Berths 105+107): 6 Liebherr single lift cranes (Urban-Econ (PTY) Ltd 2012).

The 7 tandem lift cranes will assist reduce handling inefficiencies, and support faster turnaround times for vessels. This is anticipated to a 10% gain in efficiency, which will reduce vessel turnaround times by 9 hours.

### 2.3 Other Ports

Port of Shanghai is the world's busiest trading port which handles a staggering 32million containers a year carrying 736million tonnes of goods to far-flung places around the globe.



**Fig2.** The container pier at Yangshan Port, which forms part of the Port of Shanghai, which last year handled nearly 740million tonnes of goods

The total value of Chinese imports and exports hit \$3.87trillion (£2.45trillion) in 2012 – edging past the \$3.82trillion (£2.44trillion) trade registered by the US.

The port has an area of 3.94 square kilometres - the equivalent of 470 football pitches.

China's breakneck growth rate in recent years has been driven by exports and manufacturing as well as government spending on infrastructure

In the last eight years alone, capacity at the Port of Shanghai has ballooned from 14million TEUs (a unit which is roughly the volume of a 20ft-long container) in 2004 to more than 32million last year.

The rapid expansion was largely thanks to the construction of the Yangshan Deepwater Port, which opened in 2005 and can handle the world's largest container vessels. That port alone can now shift around 12million containers a year (Ever wondered how everything you buy from China gets here? Welcome to the port of Shanghai - the size of 470 football pitches, 2013).

The world's busiest container port is about to get bigger, as the operator of the Port of Shanghai has announced that it will expand its affiliated Yangshan Port for 11,186 million Yuan (\$1.79 billion). Shanghai International Port (Group), the operator of all public terminals in the Port of Shanghai, says the project will add seven new facilities for container ships at Yangshan, which will increase the port's capacity by 40%, or by 4 million twenty-foot equivalent units (TEUs) per year.

Completion is scheduled for 2017. This expansion is likely to increase competition among ports in China, which are already struggling with an overabundance of facilities (Sugawara, T 2014).

### 3. PROBLEMS THAT MIGHT BE ENCOUNTERED DURING EXPANSION

**Subsistence Fishing:** There are approximately 4000 true subsistence fishers on the East Coast of South Africa, but none of these are registered within eThekweni region according to Ezemvelo Wildlife, who maintains the registry. Fishers in eThekweni comprise of small scale commercial and recreational participants. This is, however, an important part of locals' livelihoods and Durban's economy. Ecology studies show that there will be no long term impact on line-fish in the bay with mitigation, and during construction there will be a displacement of 50% of the fish within the turbidity plume only (within the bay). There will therefore be an impact on fishers within the beyond slightly along the coast during construction; however, the exact impact is unknown. There is no associated impact on subsistence activities per se, as these fishers do not fall into this catchment area (Urban-Econ (PTY) Ltd 2012).

**Beach tourism:** The economic value of the beach to Durban is R260 million for non-resident tourists alone. This figure would be in the billions of rand per year if a resident spend was included. The beach is considered the most important draw-card to Durban for tourists and residents. Any impact on the beaches would be detrimental to Durban's economy.

**Traffic:** Any increase in landed containers will result in an increase in trucks on eThekweni roads. Currently there are 3000 trucks leaving the port in a day. However, planning for this additional volume of road freight traffic on domestic roads adjacent the port precinct is mitigated by eThekweni's freight plan and Transnet National Ports Authority (TNPA) projects to increase road capacity, which has taken into account projected growth in port traffic in line with Transnet's projections. Furthermore, the economic impact on increased truck business and related truck servicing and production industries will be positive.

### 4. NATIONAL PRODUCTION AND TRADE TRENDS

The graph below describes export and import trends in South Africa from 2000-2011. In this time, imports and exports have grown by 12% and 11% respectively. Similarly, growth in production measured using GVA (gross value added) has grown by 11% during this time. The trend lines in the graph below show how both the primary and secondary sectors correlate with the level of imports and exports (trade). Trade and production rely on each other. The majority of this trade is done through Durban Port and therefore, as production increases, so will demand for the port.

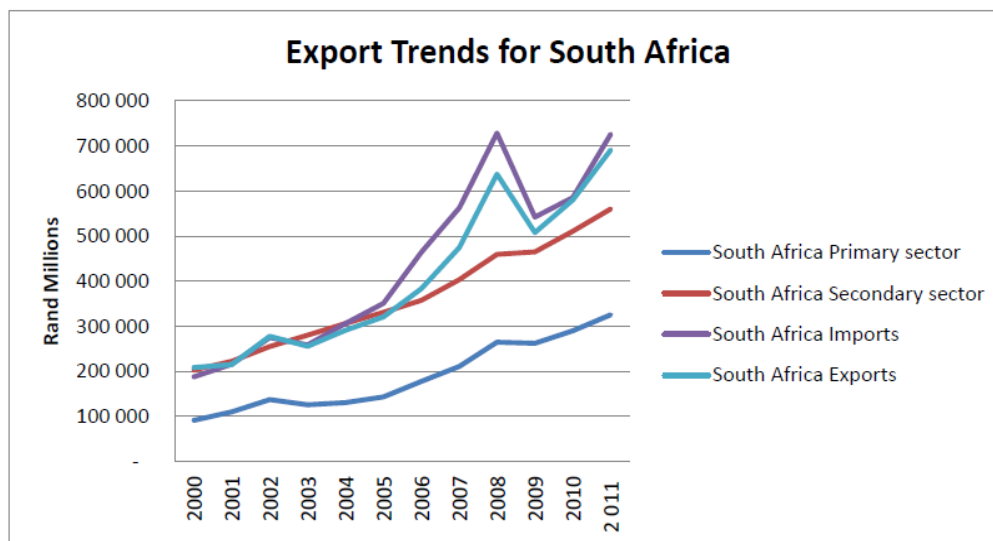


Fig3. Export trends for South Africa, 2000-2011

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The following table describes the volumes of containers handled at Durban Port across various categories in 2014. The total number of TEUs handled in 2014 was 2 720 915. Due to the recovery in the manufacturing sector and the KZN economy in general, volumes of containers both shipped and landed containers continue to grow. The proportion of TEUs shipped versus landed in 2014 was exactly 50/50 and the proportion of TEUs that were full was 76%, and empty was 24% (Urban-Econ (PTY) Ltd 2012).

**Table2.** *Volumes of containers handled in 2014*

	FULL	EMPTY	TOTAL
<b>LANDED:</b>			
DEEPSEA	1 004 104	103 229	1 107 333
COASTWISE	2 753	6 125	8 878
TRANSHIPPED	200 933	43 094	244 027
<b>TOTAL LANDED</b>	<b>1 207 790</b>	<b>152 448</b>	<b>1 360 238</b>
<b>SHIPPED:</b>			
DEEPSEA	627 731	422 242	1 049 973
COASTWISE	13 457	12 814	26 271
TRANSHIPPED	217 725	48 708	266 433
<b>TOTAL SHIPPED</b>	<b>858 913</b>	<b>483 764</b>	<b>1 342 677</b>
<b>GRAND TOTAL</b>	<b>2 066 703</b>	<b>636 212</b>	<b>2 720 915</b>

## 5. CONCLUSION

The consequence of these factors for the Durban Container Terminal is that, regardless of demand for containers, ship sizes are increasing and will continue to do so in the near future to a point where 3,000-6,000 TEU range ships are phased out and replaced with medium and large sized vessels of 8,000-10,000 TEUs. Currently, the terminal can only accommodate ships up to 9,000 TEUs (not fully laden) at high tide. If the expansion does not occur, Durban Port will be unable to accommodate an increasing number of containerships and, thus, regional competitiveness of KZN will be reduced. In the long term, this reduced competitiveness will be significant and detrimental to trade in the province and will raise cost of exports by incurring an additional feeder service, at best, to a port that can handle larger vessel sizes and at worst, losing out on the trades to other ports on the eastern sea-board of Africa that are undertaking these necessary in-situ upgrades (Urban-Econ (PTY) Ltd 2012).

## 6. RECOMMENDATIONS

The port expansion that will include the deepening and widening of berths 203 to 205 in DCT is the most cost effective and economically competitive decision for the economy and is therefore the recommended solution. Based on the foregoing, it is clear that the port expansion is in the best interest of the people of the city.

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#### **AUTHOR'S BIOGRAPHY**



**Rowen Naicker**, was born and still reside in Durban, Kwazulu Natal. He is currently studying towards a Masters of Technology at Durban University of Technology. Rowen is currently registered as a Candidate Engineering Technologist with the Engineering Council of South Africa. He has been working in the Civil Engineering environment for 10 years and is currently employed by Transnet Capital Projects at the Port of Durban.



**Prof Dhiren Allopi**, is the Associate Professor/Director in the Department of Civil Engineering and Surveying at the Durban University of Technology. He has five qualifications from four different tertiary institutions including a Doctorate Degree in Civil Engineering. Prof Allopi has over 36 years of combined industrial and academic experience mainly in the field of geotechnical, traffic and transportation engineering. Dhiren has over 110 conference proceedings and journal papers to his credit. He is professionally registered with the Engineering Council of South Africa and is a fellow member of the South African Institute of Civil Engineering. He has lectured to diploma and degree students and currently supervising twelve postgraduate students mainly in the field of traffic and transportation engineering.