

A Study on Operational Performance of Vessel Traffic Management – An Approach through Queuing Model with Special Reference to the New Mangalore Port Trust

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Abstract

Economic development of India requires an efficient national transport system. The seaports are major components of that system, the bulk of the imports and exports are entering and leaving the country via seaports. India has thirteen major seaports and 185 minor seaports along the coastline of over 7514km. The thirteen major seaports viz., Kolkatta, Paradip, Visakhapatnam, Ennore, Chennai, Tuticorin, Cochin, New Mangalore Port Trust, Mormugao, Jawaharlal Nehru, Mumbai, Kandla and Port of Blair handle about 75% of total Indian port traffic. Harbours and ports are essential for the national competitiveness in the world trade given that about 95%. The implication for maritime transportation is that changes in vessels designs and ports infrastructure for movement of containers and commodities will be more significant. In the recent years, it became quite clear that traditional traffic management instruments, measures and services are defined under the umbrella of vessel traffic management, which will not be sufficient to satisfy the needs of the stack holder in the public and private maritime domain.

Key Words: Operational, Vessel, Traffic, Management, Approach, Queuing, Model, Port Trust, Seaports, Harbors, Containers, Maritime.

INTRODUCTION AND DESIGN OF THE STUDY

INTRODUCTION:

Economic development of India requires an efficient national transport system. The seaports are major components of that system, the bulk of the imports and exports are entering and leaving the country via seaports. India has thirteen major seaports and 185 minor seaports along the coastline of over 7514km. The thirteen major seaports viz., Kolkatta, Paradip, Visakhapatnam, Ennore, Chennai, Tuticorin, Cochin, New Mangalore Port Trust, Mormugao, Jawaharlal Nehru, Mumbai, Kandla and Port of Blair handle about 75% of total Indian port traffic. Harbours and ports are essential for the national competitiveness in the world trade given that about 95%. The implication for maritime transportation is that changes in vessels designs and ports infrastructure for movement of containers and commodities will be more significant. In the recent years, it became quite clear that traditional traffic management instruments, measures and services are defined under the umbrella of vessel traffic management, which will not be sufficient to satisfy the needs of the stack holder in the public and private maritime domain. In this research an attempt was made to apply queueing theory in vessel traffic management in the new Mangalore port trust to improve the overall performance of the port. Queues are part of everyday life. However, having to wait is not a problem of individuals, but it is a problem of our nation. The amount of time that

a nation's populace wastes by waiting in queue is a major factor in both the quality of life and their efficiency of the nation's economy. Great inefficiencies also occur because of other kinds of waiting than people or vehicles standing in line. Vehicles including ships and trucks that need to wait to be unloaded may delay subsequent shipments. Delaying service jobs beyond their due dates may result in lost future business as well as their public image. Therefore the present study employed the operations research technique, particularly, queuing models to reduce time consumption and efficient operation of vessel traffic as per the schedule.

STATEMENT OF THE PROBLEM

Shipping plays an important role in the transport sector of India's economy. About 95% of the country's trade volume is moved by sea. India has the largest merchant shipping fleet among the developing countries and ranked in the 16th place amongst the countries with largest cargo carrying fleet with 10.11million GT as on 30.08.2010. Indian maritime sector facilitates not only transportation of national and international cargo but also provides a variety of other services such as shipbuilding, ship repairing, freight forwarding, lighthouse facilities and training of marine personnel etc. The capacity of major ports has increased from 20 million tonnes per annum (MTPA) in 1951 to 504.75 MTPA as on 31st March, 2007. At the beginning of the 10th plan, the capacity of the major ports was 343.95 MTPA which has increased to 504.75 MTPA at the end of the 10th plan thereby achieving the capacity addition 160.80 MTPA. In all the years of 10th five year plan, the capacity at the major ports exceeded the traffic handled. The non major ports handled traffic of 185.54 MT in 2006-07 and had a capacity of 228 MTPA at the end of 2006-07.

OBJECTIVES OF THE STUDY

The following are the objectives of the study:

- To study the vessel traffic management in general and in particular to The New Mangalore Port Trust.
- To analyze the operational performance of The New Mangalore Port Trust vessel traffic management.
- To ascertain the arrival and turn around system practiced in The New Mangalore Port Trust's berth.
- To analyze the traffic intensity of New Mangalore port Trust.
- To suggest better strategies for efficient management of vessel traffic in seaports.

RESEARCH METHODOLOGY

The reliability and validity of any research depends upon the systematic collection of data and proper analysis. The present study has used secondary data. The vessel traffic performance data were collected from the records maintained by the New Mangalore Port Trust at Mangalore. For this purpose, the researcher has collected the data for a period of 25 years from 1981-82 to 2007-08. The data thus collected were stratified into two dimensions namely the performance of New Mangalore Port Trust operations before liberalization period and after liberalization period. Appropriate statistical tools and operations research technique were employed suitably for analyzing the data.

Data Collection

In the present study secondary data collection method was employed. In order to learn more about vessel traffic management and queueing theory, several literature reviews were collected from the libraries in Chennai, Mangalore, Coimbatore and KSR learning resource centre, Tiruchengode. A number of standard text books for warehousing, queueing theory, service marketing, supply chain management, vessel traffic management, journals and magazines were studied to obtain pertinent literatures and conceptual frame work of warehousing management, vessel traffic management and queueing theory. Further, internet web resources were also used to collect the current information about vessel traffic management in seaports.

Tools for Analysis

The core of the study is focused on operational performance of vessel traffic management of The New Mangalore Port Trust. The study centers around the efficient handling of vessels in the seaport for various commodities like petroleum and oil, finished fertilizers, fertilizers of raw materials, food grains, iron ore and coal. An appropriate statistical and Operations Research techniques were employed for the analysis of the data, they are

- Average
- Standard Deviation
- Co-efficient of Variance
- Annual compound growth rate
- Triennium Average
- Queueing Theory

AN OVERVIEW OF ALL MAJOR PORTS

Major ports of India for the financial year 2009-10 and percentage growth over 2008-09

Name	Cargo Handled (2010) '000 tonnes	% Increase (over 2009)	Vessel Traffic (2009-10)	% Increase (over 2008-09)	Container Traffic (2009-10) '000 TEUs	% Increase (over 2008-09)
Kolkata (Kolkata Dock System & Haldia Dock Complex)	46,295	-14.61%	3,462	07.50%	502	17.01%
Paradip	57,011	22.84%	1,531	-0.32%	4	100.00%
Visakhapatnam	65,501	2.49%	2,406	2.51%	98	13.65%

Chennai	61,057	6.20%	2,131	2.5%	1,216	6.38%
Tuticorin	23,787	8.07%	1,414	-7.21%	440	0.22%
Cochin	17,429	14.45%	872	15.19%	290	11.11%
New Mangalore Port	35,528	-3.17%	1,186	0.16%	31	6.89%
Mormugao	48,847	17.19%	465	6.89%	17	21.42%
Mumbai	54,543	5.14%	1,639	1.67%	58	-36.95%
J.N.P.T.	60,746	6.03%	3,096	4.13%	4,062	2.78%
Ennore (corporate)	10,703	-6.93%	273	9.2%	--	--
Kandla	79,521	10.10%	2,776	10.29%	147	6.52%
All Indian Ports	560,968	5.74%	21,251	02.82%	6,865	4.25%

(Source: Indian Ports Association)

THE NEW MANGALORE PORT TRUST

The New Mangalore Port, the only Major Port of Karnataka was declared as the 9th Major Port on 4th May 1974 and was formally inaugurated by the Prime Minister of India, Smt. Indira Gandhi on 11th January 1975. The Provisions of the Major Port Trust Act 1963 were applied to NMP with effect from 1-4-1980. Since then the Port has been functioning as a catalyst for the economic development of this region and cater the needs of the shippers. Over the years the Port has grown from the level of handling less than a lakh tonnes of traffic during the inception period to 31.55 million tonnes handled during 2010-11. The major commodities exported through the Port are Iron Ore Concentrates & Pellets, Iron Ore Fines, POL Products, granite stones, containerized cargo, etc. The major imports of the Port are Crude and POL products, LPG, coal, limestone, timber logs, finished fertilizers, liquid ammonia, phosphoric acid, other liquid chemicals, containerized cargo, etc.

Chart No. 3.1
All Major Ports Performance at a Glance (2010-11)





Operational performance of NMPT

Performance Indicators	2010-11
Total Traffic (In million tonnes)	31.55
No. of vessels handled	1097
Av. Pre-berthing delay (In days)	0.60
Av. Turn Round Time (In days)	2.71
Av. Parcel size (In tonnes)	31,623
Av. Output per berth day (In tonnes)	14,204
Av. Output per hook per shift (In tonnes)	1229

Traffic handled during March 2012

Import traffic during Mar. 2012	:	22.63 Lakh tonnes
Export traffic during Mar. 2012	:	9.12 Lakh tonnes
Total traffic during Mar. 2012	:	31.75 Lakh tonnes
Total traffic during 2011-12 (upto Mar.2012)	:	329.41 Lakh tonnes
Container traffic during Mar. 2012	:	3652 TEUs
Container traffic during 2011-12 (upto Mar.2012)	:	45,009 TEUs

SUMMARY OF FINDINGS, SUGGESTIONS AND CONCLUSION

Shipping plays an important role in the transport sector of India’s economy. About 95% of the country’s trade volume is moved by sea. India has the largest merchant shipping fleet among the developing countries. The present study aims at measuring the benefits enjoyed and problems faced by port users in ports . For this purpose, a novel analysis was made by selecting 15 years data from all major ports as well as the New Mangalore Port Trust. The data thus collected were organized in a simple tabular form an appropriate and novel statistical tools were employed to analyse the data. The results and discussions were made, based on these analyses. In this chapter the key findings are recapitulated and based on these findings a few suggestions have been recommended to meet the challenges emanating from intense global competition and technological changes in shipping.

FINDINGS

1. It is found from the analysis of all major ports of India witnesses for its growth of cargo handling was the highest in Paradip port with 22.84% and the least was observed in Kolkata dock yard and Haldia dock yard with -14.61%. The vessel traffic flow has been increased at the maximum of 15.19% in Cochin port trust and it is followed by 10.29 in Kandla port trust. All other ports showed the poor progress in vessel traffic.

2. While analysing the container traffic, the percentage growth was at the maximum of 100% and the minimum was recorded in Mumbai port with -36.95%. Containers occupied the third place and Iron ore in the fourth place. On the other hand, coal progressed with 46.25 and fertilizers witnessed with 9.10 lakh tonnes.
3. It is divulged from the analysis of port capacities of all major ports in India showed that POL progress was the highest in all ports and it is followed by general break bulk Cargo.
4. The major port trusts have been functioning as a catalyst for the economic development of this region and caters the needs of the shippers.

SUGGESTIONS

1. It is found from the analysis that the total traffic handled during 2011-12 of both imports and exports contributes 329.41 lakhs tonnes. Hence, it is suggested that the segmentation for the entire port area may be laid down in a port land that sets the conditions for ships and cargo operations at any time and any place.
2. While concentrating the vessel carrying various products like crude oil, POL, Ore, Coal, General cargo and container will be most likely larger in future. The NMPT is however, not suitable to handle very large of over DWT 1,00,000 and it needs to develop the infrastructure facilities to meet the market requirements.
3. The NMPT should be focused on extension of present cargo flows and attract new cargo flows for all types of commodities. And the success is that all berths and jetties should be operated by professional stevedores through modern handling technology, to satisfy claimed demands and maintain ports overall handling of liquid, dry bulk and container cargos.

CONCLUSION

After globalization, India has been emerging as a modern economical country. Globalization has its impact in the development of ports in India. There is a clear trunk towards the global ownership and management of port terminals as witnessed by the entry of P and O lines, DP world, Maersk-lines, PSA, etc in certain Indian ports. This has resulted in transfer of a range of port related activities from mainly public owned to private owned under takings. This has shown paradigm shift and emerging new private ports within a maritime state competing stiffly with the major ports including the New Mangalore Port Trust in attracting and diverting the cargo. Later various means of competition is emerging among the major ports and also ports within and outside the region. This has also compelled the New Mangalore Port Trust to pay more attention for improvement in productivity through introducing ultra modern infrastructure facilities in the berth yard and warehouses. This enables the port authorities to face the prevailing tough competition. To develop the New Mangalore Port Trust with ultra modern facilities as recommended in the suggestions requires heavy investment, which may be obtained from the government of India through proper way of highlighting the needs of fund requirements by the top authorities in the New Mangalore Port Trust, to face the prevailing cut-throat competition. The present research is a rewarding exercise for the scholar, and the researcher will be delighted if the policy makers in the New Mangalore Port Trust as well as the Ministry of shipping incorporate the suggestions recommended in this research work.

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