"A STUDY ON MAJOR PORTS PERFORMANCE WITH SPECIAL REFERENCE TO WEST COAST OF INDIA"

Project Report submitted in partial fulfilment of the requirement for the award of degree of

MASTER OF BUSINESS ADMINISTRATION
In

PORT AND SHIPPING MANAGEMENT

By

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DECLARATION

I, **DHANESH V (2005304014)** student of **School of Maritime Management, Indian Maritime University- Kochi Campus** hereby declares that this project report titled **A Study on "Major Ports Performance with Special Reference to West Coast of India"** submitted in partial fulfillment of the requirement for the **degree of Master of Business Administration in Port and Shipping Management** is my original work carried under the guidance of my project guide **Dr Sreejith U**. It has not formed the basis for the award of any degree/diploma or associate ship of any University/Institution. The information submitted is true and original to the best of my knowledge.

Place: KOCHI **DHANESH V**

Date: **Reg No. 2005304014**

ACKNOWLEDGEMENT

First and foremost, I would like to thank God the almighty who has granted countlessblessings, knowledge and opportunity to complete this project to its fullest.

I would like to thank my parents for the moral support and cooperation throughout the programme.

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I would like to express my deep sense of gratitude to **Dr.Sreejith U** for his esteemedguidance and expert suggestions in each step of the project, alleviating inspiration, encouraging and kind supervision in the completion of my project.

I am also thankful to faculty members, library staffs, my friends and my well-wisherswho were very cooperative during my project in providing appropriate guidance and support without whom this project would not have been completed successfully.

EXECUTIVE SUMMARY

Maritime transport activity is driven by developments in world economy, viz, growth in world output and trade. Thus, volume of seaborne cargo traffic handled by ports is mainly shaped by the levels and changes in both the global and domestic activity. Ports have played an important role in the economic development of India, and its vast hinterland, and are an important infrastructural resource for the country's trade. While the financial performance of the ports is improving marginally in value terms, problems of productivity and efficiency affect their operations.

There are 12 major ports in India governed by the Major Port Authority Act, 2021, which serve as the primary conduit for India’s international trade, by handling three-fourths of the nation’s maritime cargo.These ports function as autonomous bodies under the Ministry of Shipping. They follow a traditional business model where ports take upon themselves, the task of creation of common infrastructure and the responsibility of commercial operations like marine and cargo handling services.

The performance of India's major west coast ports in terms of key operational performance metrics is examined in this research. India's proportion of international trade is increasing as a result of its rapid economic expansion. This increases the strain on these ports, which handle a significant amount of the commerce, to function at their best. The study uses a range of statistical approaches to analyse numerous performance indicators and examines the state of each port in several performance categories. This will allow the ports to assess their own efficiency and identify the causes of their inadequacies.

In this regard, the effort continues to construct an integrated composite performance index by assigning comparative weightages to various variables in order to evaluate the relative overall performance of various ports. The study emphasizes the importance of such estimations in determining the consistency of performance, both within and between ports, in order to plan and implement ways to improve performance.

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ABBREVIATION

- TEU: Twenty-Foot Equivalent Unit
- MPA: Mumbai port Authority
- VPA: Visakhapatnam port Authority
- JNPA: Jawaharlal Nehru port Authority
- IPA: Indian ports association

CHAPTER 1

INTRODUCTION

1.1 INTRODUCTION

The Indian subcontinent has had fame in the world map, in terms of trade since the ancient times. It was through the water route that various goods were imported and exported by the erstwhile kings and the emperors in the older days. British's, Portuguese, and many voyagers came into India, partly because they found the water routes to be easy roads to the rich country of India.

According to the Ministry of Shipping, around 95 percent of India's trading is by volume and 70 percent by value is done by maritime transport. India has 12 major ports and 187 non-major ports. The Indian ports and shipping industry plays a vital role in sustaining the growth in the country's trade and commerce. India is the 16th largest maritime country in the world with a coastline of about 7,517 km.

With about 7,500 kms long stretch of coastline, in the states of Maharashtra, Goa, Gujarat, Karnataka and Kerala in the western part and Tamil Nadu, Andhra Pradesh, Orissa and West Bengal in the eastern side, riches in India have been contributed much by the ports. Most of the ports in India are located in these states.

Since ports are trade gateway for a nation, their ability to meet the increasing demands of a rapidly growing economy is crucial for addressing the rising import and export traffic. With the objective in mind, the planning commission and the Ministry of Ports, Shipping and Waterways have initiated a coordinated national level strategic planning exercise to identify, in a structural manner, the required investments in ports and related infrastructure, while at the same time reducing dependence on government funds.

All the major ports are under the administrative control of the union Ministry of Ports, Shipping and Waterways and are under the regulatory authority of the Tariff Authority for Major Port (TAMP) except the new Port of Ennore. Each Port is managed by Port Trust with Chairman being appointed by Ministry of Ports, Shipping and Waterways. Other member of port trust represents various interest groups, including labours, the shipping industry and major customers.

1.1.1 MAJOR PORTS IN INDIA

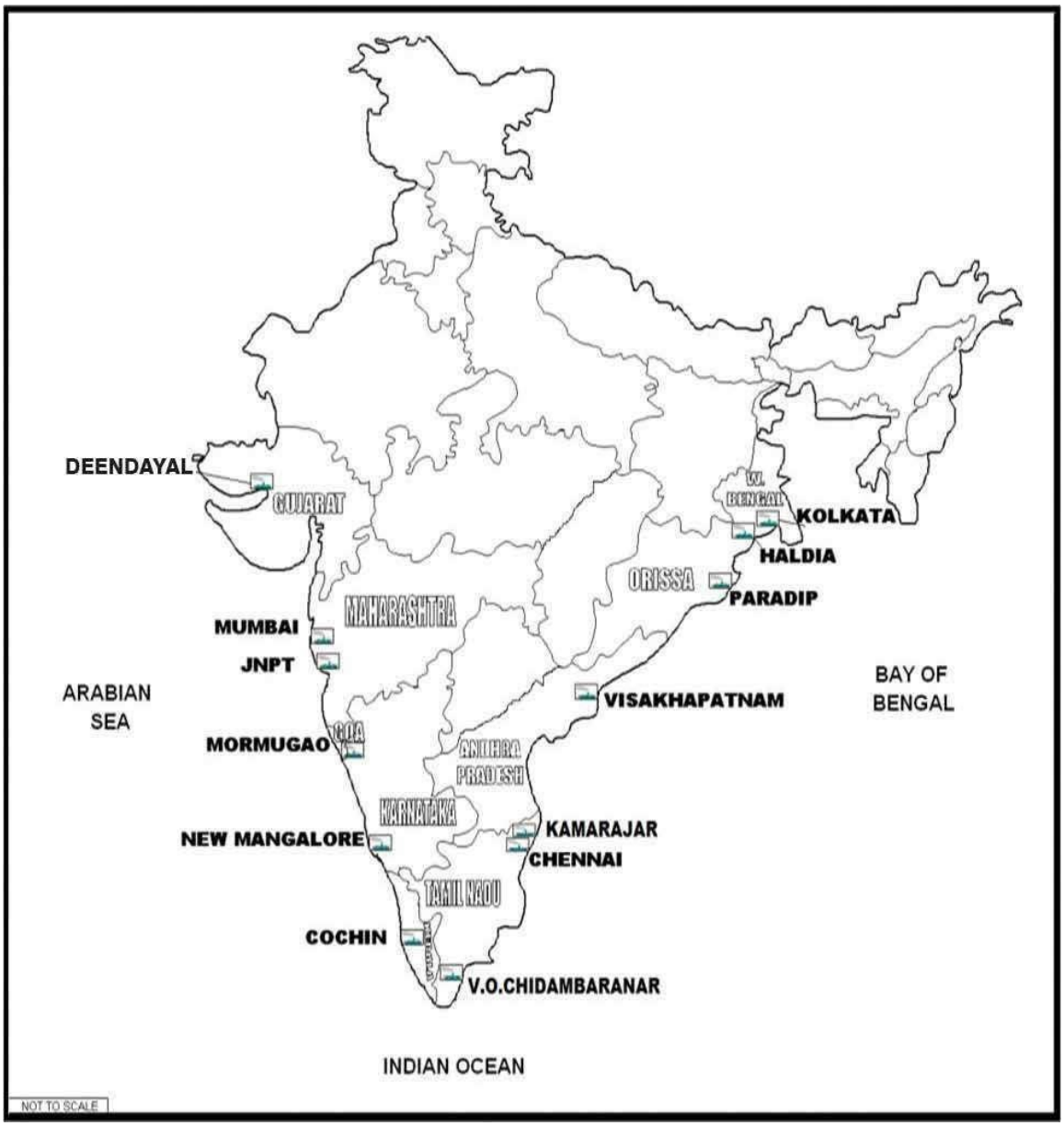

Fig 1.1 Major Ports of India

S.NO.	NAME OF THE PORT	COAST	STATE
1	Deendayal Port	Western Coast	Gujarat
2	Mumbai	Western Coast	Maharashtra
3	JNPT	Western Coast	Maharashtra
4	Mormugao	Western Coast	Goa
5	New Manglore	Western Coast	Karnataka
6	Cochin	Western Coast	Kerala
7	V.O. Chidambaranar Port	Eastern Coast	Tamil Nadu
8	Paradip	Eastern Coast	Odisha
9	Vishakapatnam	Eastern Coast	Andhra Pradesh
10	Chennai	Eastern Coast	Tamil Nadu
11	Kamarajar (Ennore)	Eastern Coast	Tamil Nadu
12	Kolkata Port	Eastern Coast	West Bengal

Table 1.1 Major Ports India

1.1.2 MARKET SIZE

India’s key ports had a capacity of 1,561 million tonnes per annum (MTPA) in FY21. In FY22 (until February) 2022, all key ports in India handled 650.52 million tonnes (MT) of cargo traffic. India's merchandise exports in FY22 were at US$ 417.8 billion, up 40% from the previous year.In October 2021, India’s merchandise exports grew 43.05% YoY to reach US$ 33.65 billion.

The Government has taken several measures to improve operational efficiency through mechanisation, deepening the draft and speedy evacuations.

1.1.3 INVESTMENTS/DEVELOPMENTS

- India has plans to invest US$ 82 billion in port projects by 2035.
- Indian ports received cumulative FDI inflow worth US$ 1.63 billion between April 2000 and June 2021.
- In October 2021, the Syama Prasad Mookerjee Port, Kolkata, gave importers the opportunity to bring in vessels at the deep drafted anchorages located at Sagar, Sandheads and X Point.
- In October 2021, Adani Group announced that it wants to make Adani Port a net-zero carbon emitter by 2025 and power all its data centres with renewable energy by 2030. Jawaharlal Nehru Port Trust (JNPT) Special Economic Zone (SEZ) became the first of its kind operational port-based multi-product SEZ in India.
- The Competition Commission of India (CCI) approved Adani Ports and Special Economic Zone's proposed acquisition of 10.40% equity investment in Gangavaram Port in September 2021. The 10.4% equity shareholding will be bought from the government of Andhra Pradesh.
- APSEZ (Adani Ports and Special Economic Zone) plans to become the world's largest private port company by 2030 and carbon neutral by 2025.

- In July 2021, Adani Ports & Special Economic Zone stated that it has priced a US$ 750 million senior unsecured dollar notes issuance with 20-year and 10.5-year tranches, with fixed coupons of 5.0% and 3.8%, respectively.

- In June 2021, Adani Ports and Special Economic Zone Ltd (APSEZ) handled cargo volume of 75.69 MMT, registering a YoY growth of 83%, in the first quarter of FY 2021-22.

1.1.4 GOVERNMENT INITIATIVES

- Some of the major initiatives taken by the government to promote the ports sector in India are as follows:
- In December 2021, India and Russia are talking about collaborating on shipbuilding and inland waterways.

- In November 2021, the Union Minister for Ports, Shipping and Waterways & Ayush, Mr. Sarbananda Sonowal, inaugurated the new Radars and Vessel Traffic Management System of Cochin Port Trust. The VTMS (Vessel Traffic Management System) commissioned in Cochin Port in 2009 has been upgraded with a state-of-the-art system consisting two new radars, one AIS Base station, three VHF Radios and associated software & hardware installed at a cost of Rs. 5.8 crore (US$ 772,161.66).

- In November 2021, Union Minister for Ports, Shipping & Waterways and Ayush, Mr. Sarbananda Sonowal, inaugurated the simultaneous launching of five vessels at Cochin Shipyard Limited (CSL).

- In November 2021, the Union Minister of Culture and Tourism, Mr. G Kishan Reddy, announced that the centre has sanctioned Rs. 100 crore (US$ 13.31 million) for the Visakhapatnam port cruise terminal.

- The Draft Indian Ports Bill 2021, which was circulated in July 2021, aims to centralise the administration of minor ports that are currently managed by state governments.

- The Inland Vessels Bill 2021 was approved by the Lok Sabha in July 2021. Instead of distinct regulations created by the states, the bill attempts to include a single legislation for the country. The registration certificate issued under the new law will be valid throughout the country and state approvals will not be necessary. The bill also establishes a single database for recording vessel and crew information on an Internet portal.
- In July 2021, the Marine Aids to Navigation Bill 2021 was passed by the Parliament, incorporating global best practices, technological developments and India's international obligations in this field.

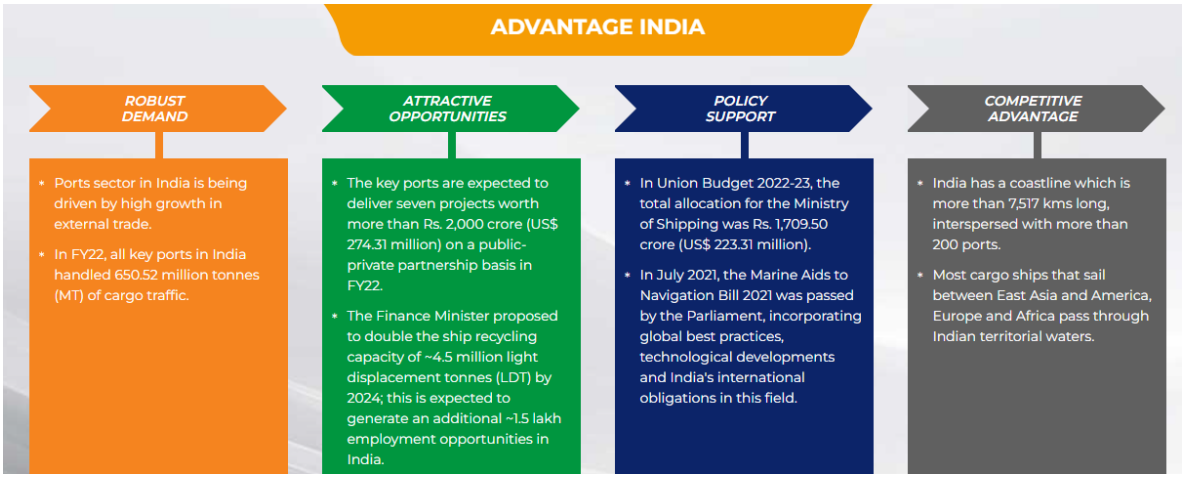

Fig 1.2 Advantage of Indian Ports

1.2 RESEARCH OBJECTIVE

- To Study the efficiency of the Western coast ports
- To study the performance of Western coast ports
- To study the performance trend analysis of Western Coast ports
- To suggest findings for above study

1.3 SCOPE OF STUDY

- Most of the cargo meant to us of European countries transported through west coast of major ports.
- From east coast it takes a long way to go to European and American countries.

CHAPTER 2

RESEARCH METHEDOLOGY

2.1 BIBLIOGRAPHIC SCOPING

In this chapter, we will look at some of the studies that have been done to assess the importance of infrastructure and the performance of India's major ports. The studies listed below allowed the researcher to conduct this research.

There are few studies on port infrastructure and performance, especially in Indian ports. As a result, research on the infrastructure and performance of India's major ports are summarised below.

Anindita Manda (2016), in his article on "Performance analysis of major ports in India: a quantitative approach" The performance of 13 major Indian ports in terms of key operational performance metrics is examined in this research. India's proportion of international trade is increasing as a result of its rapid economic expansion. This increases the strain on these ports, which handle a significant amount of the commerce, to perform at their best. The study uses a range of statistical approaches to conduct a systematic analysis of several performance indicators over a ten-year period (2003–2013) and examines the status of each port in various performance areas.

Mrinal Kumar Dasgupta, Deepankar Sinha(2016) "Impact of Privatization of Ports on Relative Efficiency of Major Ports of India" The purpose of this article is to determine the impact of liberalisation on the efficiency of container terminals in India's major ports. Since 1991, India has been undergoing liberalisation. As a result, many of India's main ports have privatised their container terminals, which are overseen by the union government. Data envelopment analysis was used to evaluate the efficiency of privately managed terminals beneath major ports to public container terminals in this study (DEA). The study's findings demonstrate that, while container terminal efficiency is improving, there is still room for improvement.

Subramanian.S and llangovan. D (2007) in their study on "Challenges of Cargo Container Services in Major Ports in India" aimed to found out the challenges of cargo container services in major ports In India. It was discovered that the government had chosen specific areas for private participation and had sent forth guidelines. The idea was floated that JNPT, Chennai, Tuticorin, Mumbai, Cochin, and Kolkata should be linked to export. Connected businesses with quick routes to enable a smooth flow of commodities between them distinct entities All CFS/ICDs should be modernised to world standards by the government, as well as formalised. a comfortable working atmosphere among various individuals such as authorities, operators, labour, and others by adopting a code of behaviour for all ports, exports and imports will be facilitated.

M.K. Nagaraj, **Subhash C. Yaragal and Sakethnath**(2008) in their study on "Sensitivity analysis of performance appraisal index parameters of major ports" in this study, multiple characteristics are used to develop a performance appraisal index for major ports in order to compare the efficiency of major ports in India. The statistics of India's major ports were used to identify important factors. Sensitivity analyses are also carried out in order to develop techniques for making more productive decisions and improving performance.
Infrastructure plays a critical part in the nation's economic development. Approximately 90% of international freight is transported by ships. The performance of ports is significant in this regard. Multiple settings should be used to ensure the port's performance. A study like this can help with not only comparing different ports based on performance, but also with remedial steps, finding areas of weakness, and reinforcing crucial factors.

J G R MONTEIRO (2010)- "Measuring Productivity and Efficiency of Major Ports of India", The author of this study uses Data Envelopment Analysis to assess the productivity and efficiency of India's 12 major ports. The Malmquist Productivity Indices, which were calculated for the sample period 2001-08, differ significantly amongst ports. While major port performance has improved significantly since 1991, much more has to be done in terms of integrating contemporary technologies into traffic handling.

2.2 RESEARCH DESIGN

The research methodology which has been used for the above study is based on secondary data collection. The data has been collected through following ways:

- Indian port association (IPA)
- Journals
- Books
- Past reports
- Online sources

2.3 ANALYSIS APPROACH

The research methodology which has been used for the above study is based on secondary data collection.

The data has been collected through following ways:

- Indian port association (IPA)
- Journals
- Books
- Past reports
- Online sources

2.4 METHODOLOGY LIMITATION

- The data is based on secondary sources
- There can be variation between primary and secondary data for this report
- Limited access to data
- Time constraint

CHAPTER 3

PROFILE OF WEST COAST MAJOR PORTS

3.1 COCHIN PORT

Cochin Port is a major port on the Arabian Sea – Indian Ocean sea-route and is one of the largest ports in India. The maritime gateway to peninsular India, Cochin is the fastest growing logistic center emerging in to a major International transshipment terminal. An all-weather natural Port, and located strategically close to the busiest international sea routes Cochin is promoting a major liquid terminal, bulk terminal and maritime industries in its port based SEZs.

3.1.1 BERTH DETAILS

The main inward shipping channel of the port divides in to the Ernakulam and Mattancherry channels. The Mattancherry channel is 4.08 Km long, with the width varying from 180 to 250 m and a draft of 9.14 m except at Boat Train Pier where the draft is 10.0 m.

Mattancherry Wharf is sub–divided into four berths – Q1, Q2, Q3, Q4

- Q1 berth have a maximum draft of 9.14m and overall length of 180m which is given lease to Ambuja Cements.
- Q2 and Q3 berths also known as Coastal berth have a maximum draft of 9.14m and overall length of 180m which is used by Coast Guard.
- Q4 berth can accommodate vessels with maximum draft of 9.14 and overall length of 180m which is used to handle liquid bulk cargoes like Fuel.

On the Mattancherry Channel there are four alongside berths, for general cargo, one Boat Train Pier and two jetties for miscellaneous cargo.

The Ernakulum Channel is 4.90 Km long, with the width varying from 250 to 500 m and has a draft of 12.5 m up to the Oil Terminal. The 1,024 m long Ernakulam Wharf has six alongside berths, five for general cargo and a fertilizer berth. Besides these, there are three oil berths in the Ernakulum channel.

BERTH/MOORING	Maximum Length Overall (m)	Maximum Draft(m)	Products Handled
SPM	370	22.50	Crude
COT	250	12.50	Crude/POL
NTB	213	9.14	POL
STB	170	9.14	POL
Ernakulam Wharf (Q5-Q6)	250	10.00	Dry Cargo/CBFS
Ernakulam Wharf (Q7)	250	10.50	Dry Cargo
Ernakulam Wharf (Q8-Q9)	250	11.00	Dry Cargo
Fertilizer Berth (Q10)	207	10.70	Fertilisers/Phos. Acid
SCB	170	9.14	Liquid Bulk
NCB	170	9.14	Dry/Liquid Bulk
B.T.P	190	10.00	Dry/Liquid Bulk
Mattancherry Wharf (Q1)	180	9.14	Dry Bulk
Mattancherry Wharf (Q2 & Q3) Coastal Berth	180	9.14	Dry Bulk
Mattancherry Wharf (Q4)	180	9.14	Liquid Bulk
ICTT Valarppadam (V2-V3)	335	14.5	Containers
LNG Puthuvypin	320	12.5	LNG

Table 3.1 Cochin Port Berth Details

3.1.2 DETAILS OF CARGO STORAGE FACILITIES

COVERED AREA (WAREHOUSE)

TRANSIT SHEDS AND OVERFLOW SHEDS		
Locations	**Total Sheds**	**Area (Sqm)**
Mattancherry Wharf	6	19,160
Ernakulam Wharf	4	13,200
Container Freight Station	1	10,000
Grand Total	11	42,360

Table 3.2 Transit Sheds and Overflow Sheds Cochin Port

Location	**Total Sheds**	**Area (Sq.m.)**
Mattancherry Wharf	4	11800
Ernakulam Wharf	1	2980
Cement Godown	1	1000
BTP	1	6000
Grand Total	7	21780

Table 3.3 Warehouse

3.1.3 PORT FLOTILLA

a) MOORING LAUNCHES

Five mooring launches are available for passing mooring lines at Tanker, Coal and fertilizer (Q10) berths. On other berths lines are passed by heaving lines.

b) PILOT BOATS

2 No's of Pilot boats of Red Hull and White Superstructure with "PILOTS" embossed on the sides. DREDGERS. Grab Hopper Dredger NEHRU SHATABDI 1992 built with 1500 m3 hopper capacity.

c) TUGS

The following tugs are available in Cochin normally two tugs are used for each shipping movement as per the requirement of the Pilot and the cost of the tug is included in the Pilotage charges.

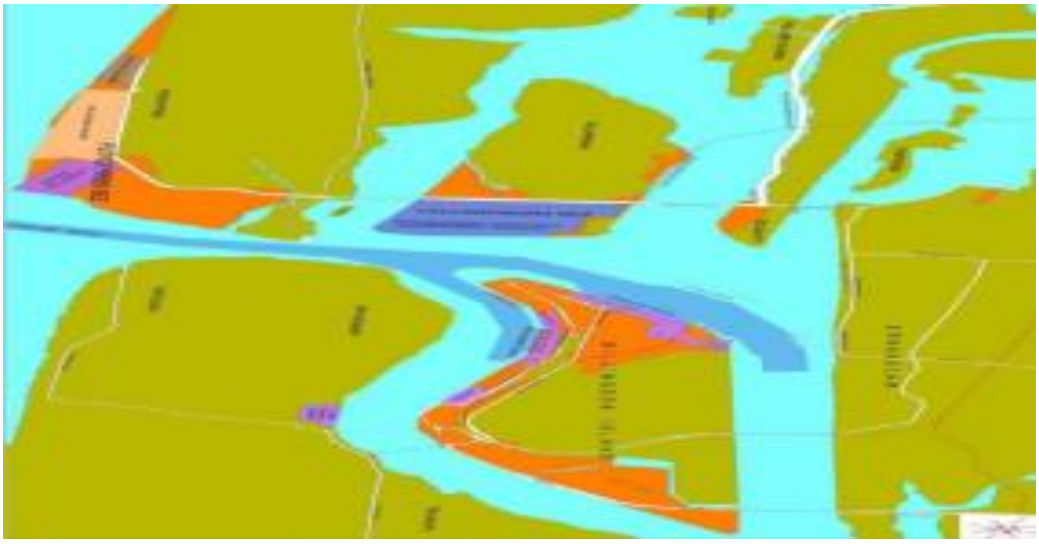

Fig 3.1 Cochin Port Layout

3.1.4 FEATURES OF COCHIN PORT TRUST

- All weather port
- IS09001:2008 Port
- Closest Indian port on the international sea route
- "Walk in" berthing priority
- 24-hourpilotage
- No drafts restrictions (10-12 meters around the year)
- Bunkering and water services
- Attractive tariff structure
- Free of congestion
- Higher labor productivity and cost effectiveness
- Linked to main centers of the country by rail, road and air
- Single window clearance for customs, immigration and health clearance
- Port officers at services
- Least turnaround time
- Warehouse capacity
- Zero per cent pilferage
- Star hotels
- Yacht parking zone
- Hydrofoil services to Trivandrum and Calicut
- ERP implemented port (first in India)

3.2 NEW MANGALORE PORT

New Mangalore Port is a modern all-weather Port situated at Paramour, Mangalore, Karnataka on the West Coast of India, 170 nautical miles South of Mormugao Port and 191 nautical miles North of Cochin Port. The port has entrance channel of 7.5 km, with 245 meters width and dredged depth of 15.4 m. The Port has land area of 1,960 acres and water area of 330 acres. Out of the 2,290 acres only 23 acres are available for further allotment. The port serves hinterland of Karnataka state and to some extent state of Kerala. The major commodities exported through the port are iron ore concentrates and pellets, iron ore fines, manganese, granite stones, coffee, cashew and containerized cargo. The major imports of the port are crude and petroleum products, LPG, wood pulp, timber logs, finished fertilizers, liquid ammonia, sand, phosphoric acid, other liquid chemicals, and containerized cargo.

3.2.1 SALIENT FEATURES

- NMPT is one of the few selected Ports in the country with Draft of 14m and can accommodate Cape vessels.
- NMPT offers one of the lowest Port Tariffs and Lowest Cost per Tonne among Major Ports.
- On arrival berthing for majority of vessels.
- Modern fully fledged Cruise Terminal.
- Mechanized handling for iron ore pellets and State of the art coal terminal.
- Sufficient open and covered storage area (6 Sheds with over 25000 sq. m covered area)
- Rail Sidings and Rail Marshalling Yard for EXIM and Domestic Rakes.
- Equipped with Single Point Mooring Facility which can accommodate Very Large Crude Carriers.
- Second highest LPG, Third highest Iron ore pellets (Export) handling among major ports.
- Clean Port – 100% solarised port.

3.2.2 MILESTONES

	Event	Date
1	➔ Formation of Mangalore Harbour Project	21-04-1962
2	➔ Declaration as Major Port	04-05-1974
3	➔ First Ship M.V. SASTUMARU berthed	10-06-1974
4	➔ Formal Inauguration of the Port with 4 berths	11-01-1975
5	➔ Commissioning of Oil Jetty(9)	12-05-1975
6	➔ Formation of Port Trust Board	01-04-1980
7	➔ Commissioning of Iron Ore Berth(8)	15-08-1980
8	➔ Commissioning of Berth No.5	01-02-1984
9	➔ Commissioning of Berths 6&7	07-11-1989
10	➔ RCHW formation	15-03-1990
11	➔ Commissioning of Oil Berth No.10	15-02-1996
12	➔ Commissioning of Oil Berth No.11	21-06-2002
13	➔ Commissioning of Berth No.12	27-10-2003
14	➔ ISO 9001:2000 Certification for NMPT	27-10-2003
15	➔ Accredited with ISPS	10-02-2004
16	➔ Commissioning of Berth No.14	14-02-2006
17	➔ ISO 14001:2004 certification from IRQS	22-02-2011
18	➔ Commissioning of B.15(UPCL)	Nov.2012
19	➔ Commissioning of B.13	Dec.2013
20	➔ Commissioning of Coal Terminal at B.16	May 2019

Table 3.4 Milestones Of New Mangalore Port

3.2.3 COMMERCIAL ADVANTAGES

Customer satisfaction is the corner stone around which all our services are devised. We strive to give them a competitive edge, both today and in the future. The congestion free all-weather port helps vessels to berth all through the year. A secured container yard prevents theft and pilferage and through the single-window clearance and simplified documentation system cargoes move in or out at speeds unmatched by any other port.

3.2.4 NEW MANGALORE PORT LAYOUT

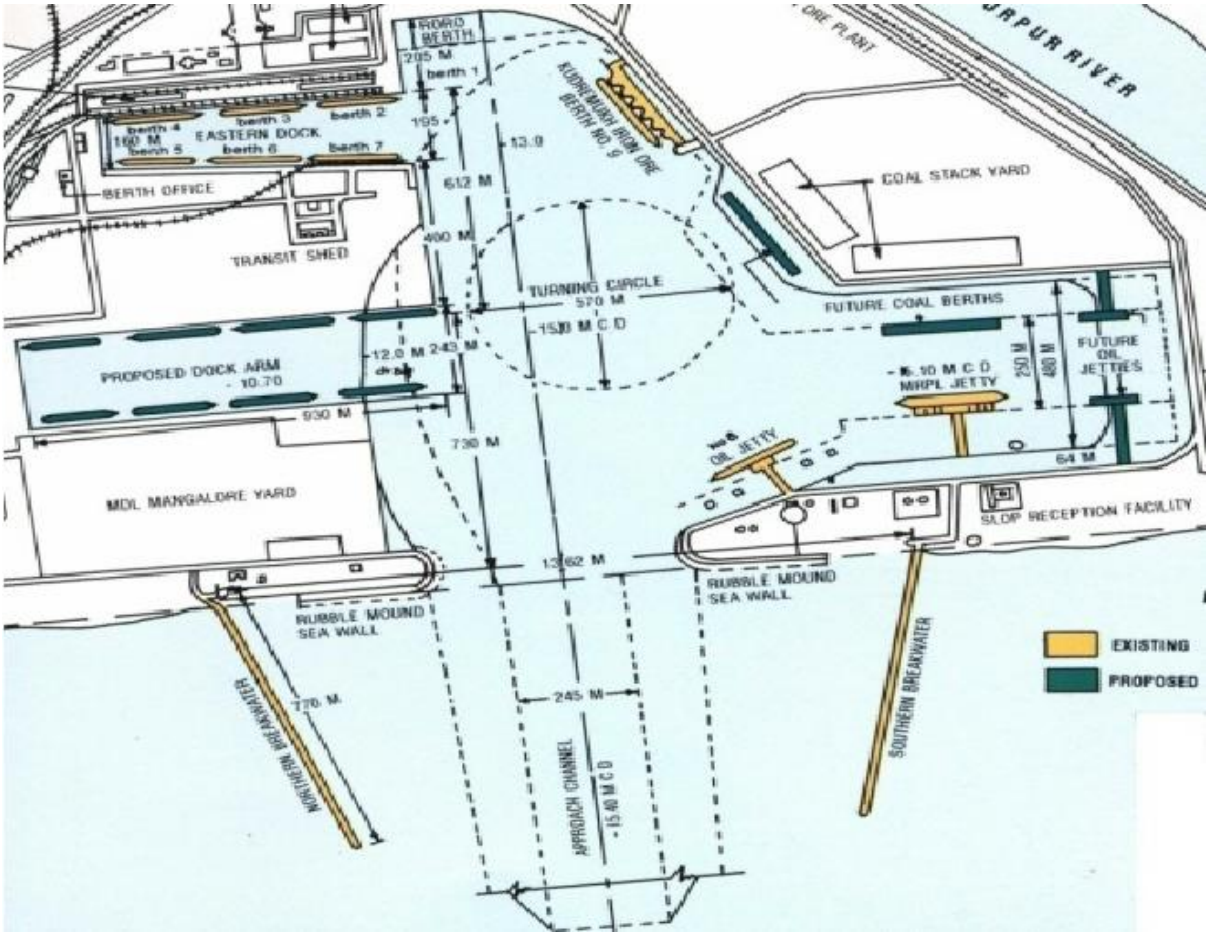

Fig 3.2 New Mangalore Port Layout

3.3 MARMUGAO PORT

Mormugao Port, commissioned in 1885 is one of the oldest ports on the west coast of India in the state of Goa and is blessed with a protected open type natural harbour. Over the years, it has developed a deep draft channel. With its location at the mouth of the Zuari River, it is a crucial component in the flourishing export industry of the state of Goa. It became one amongst the major ports of the country in 1964 and has been relentlessly serving the nation in its economic development.

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3.3.1 FACILITIES

MPA has berths for coal and iron ore. It also has a berth for cruise ships and even has a dedicated Cruise Terminal building, and hosts a variety of cruise ships the year-round. It plans to expand with a dedicated multipurpose cargo berth, a general cargo berth project (to replace the ship repair yard), and dedicated berths for Navy and Coast Guard.

Ore brought via barges is either collected to be loaded onto bulk carrier ships or directly loaded onto the ships using trans-shippers. Ore which is collected on the port is handled by machinery called MOHP (Mechanical Ore-Handling Plant). This includes massive bucket wheel loaders and miles of conveyor belts. MPA's MOHP has now been converted to a general cargo handling berth.

Adani Ports & SEZ Limited has a one-berth terminal (Berth 7) at MPA. It has a capacity of 7 MMT cargo. It can handle coal cargo, Panamax and capesize vessels. Its main feature is a mechanized material handling system of conveyor systems and stacker cum reclaimers. This system has a stacking capacity of 5000 TPH and reclaiming capacity of 2500 TPH. Jindal South West Port Ltd has two berths, and berths 8 and 9 are currently run by Vedanta. They all mainly handle coal**.**

3.3.2 TYPES OF CARGO

MPA briefly became the leading iron ore exporting port in India, with about 54.50 million metric tonnes (MMT) of iron ore traffic in 2010–11 (about 90% of this was exported to China). Subsequently, the port's cargo volume dropped to 39 MMT in 2011-12, with iron ore accounting for 29.21 MMT, due to a global reduction in demand for iron ore.

Berth numbers 10 and 11 of MPA are dedicated to coal handling.MPA also exports manganese and bauxite.

3.3.3 MARMUGAO PORT LAYOUT

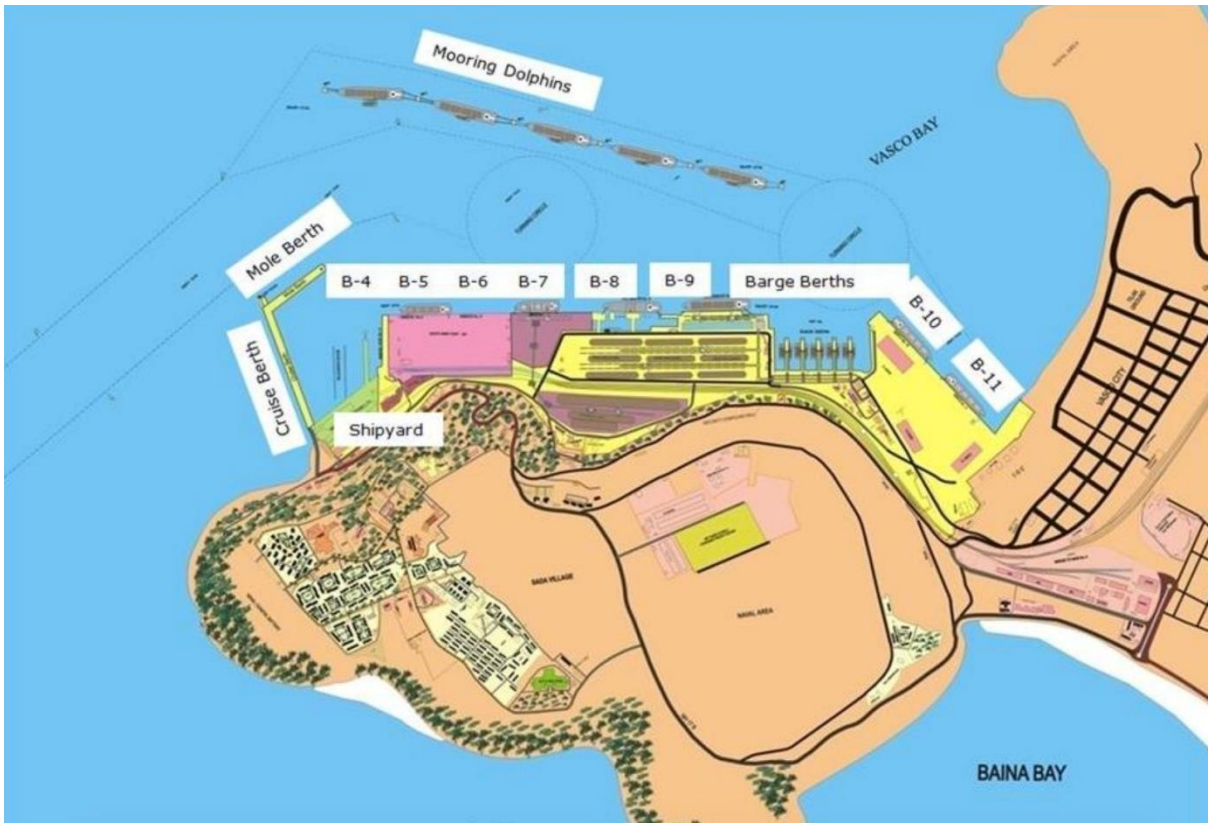


Fig 3.3 Marmugao Port Layout

3.4 JAWAHARLAL NEHRU PORT (OR NHAVA SHEVA PORT)

The Jawaharlal Nehru Port at Navi Mumbai (formerly known as the Nhava Sheva Port) located within the Mumbai harbour on the west coast of India, commissioned on 26th May 1989. It occupies a place of prominence among the major Indian ports. It is the second youngest and one of the most modern major ports of the country. It was initially planned to be a "satellite port" to the Mumbai Port with the purpose of decongesting traffic at the latter, eventually it was developed as an independent port on its own right and it became the country's largest container port.

JNPA enjoys very good road and rail linkages with its hinterland as well as important business centers like Thane, Nasik and Ahmadabad, which facilitate excellent port-industry interface. It is also characterized by highly automated and round-the-clock operations and has demonstrated enough potential and capacity to develop as India's first major hub port.

3.4.1 HIGHLIGHTS

- JNPT was commissioned on 26th May 1989.
- It is located at 18 degrees 56' 43" N (latitude) & 72 degrees 56' 24" E (longitude) Land Area is 3000+ hectares.
- It handles containers, liquid bulk & cement ships.
- JNPT has four dedicated container terminals namely JNPCT, NSICT, GTIPL & NSIGT. In addition, there is one liquid cargo berth and shallow water berth.
- JNPT has certified with ISO 9001:2008, ISO 14001:2004, OHSAS 18001:2007, ISO 27001:2013 and ISPS compliant since 2004.
- The maximum permissible draught at (Shallow Water Berth) SB01 is 6.00 m and SB02 is 10.00 m and SB03 is 10.00 m.
- Maximum permissible draught at JNPCT, GTI, NSICT & NSIGT terminals and (Liquid Berth No.1) LB01 is 16.5 m and at LB02 (Liquid Berth No.2) is 10.5 m.

- It handles about 56% of total containers handled by all major ports in India connected with 34 CFSs and 46 ICDs destinations.

3.4.2 JN PORT'S ACHIEVEMENTS

JNPT is the only major port in India to have achieved all the four certifications:

- ✓ ISO 9001:2008 Standards for Quality Management System
- ✓ ISO 27001:2013 Standards for Information Security Management System
- ✓ ISO 14001:2004 for Environmental Management System
- ✓ OHSAS 18001:2007 for Occupational Health & Safety Management System. Year – 2017

3.4.3 PORT DETAILS

- Latitude: 18 56'43" North and Longitude - 72 56'24" East along the eastern shore of Mumbai harbour of Elephanta Island.
- Mean sea level is 2.51 m above Chart Datum.
- Mean Spring Tidal Range in the harbour is 3.7 m.
- Port handles vessels having draught upto14.00 m by using tide.

3.4.4 CHANNEL

- Common Harbour channel for JNPT and Mumbai Port, up to no. 4 berth of Jawahar Dweep Terminal.
- Designed Channel depth is 13.1 meter in JNP channel & 14.2 meters in outer harbour channel. (Below Chart Datum)
- Channel width 370 meters at straight reach, 460 meters at the berths.
- Depth at berth:16.5 meters (Below Chart Datum)
- Anchorage of 600 meters diameter.
- 2322 meter of quay length for Container Berth.

- 445 meters of quay length of Feeder Container / Cement / Project Cargo Ships.
- Twin Berth Liquid Cargo Jetty, Total length 390 m with additional Mooring Dolphins.

3.4.5. JNPA LAYOUT

Fig 3.4 JNPA Layout

3.5 MUMBAI PORT

Mumbai Port is one of the major ports located on the west coast of India, commissioned more than a century ago is a natural harbor, situated at latitude 18° 54' N and longitude 72° 49' E, protected on the east by mainland and sheltered by Mumbai Peninsula on the west. The main harbor accommodates the Indira Dock and the Ballard Pier. Further northeast of the harbor is located Jawahar Dweep accommodating the POL berths. The Pir Pau chemical berth is at the northern extremity of the harbor's deep water.

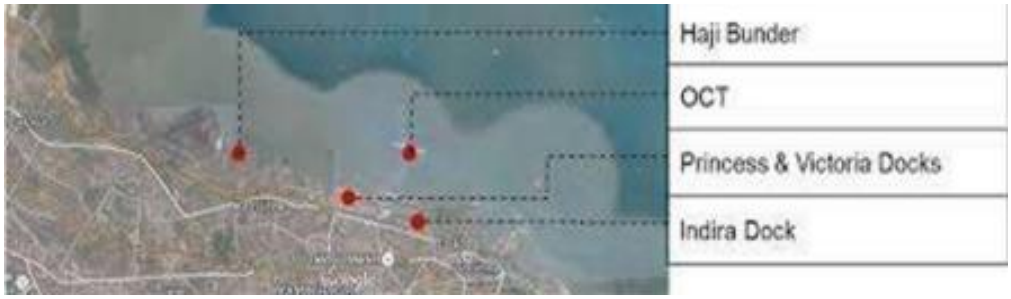
In addition, there are 63 general ship anchorages straddling the main harbor channel from south Karanja buoy northwards as far as the Indira Dock approach channel. Crude and POL products are handled from the jetties at Jawahar Deep and chemicals are handled at Pir Pau. Dry bulk, break bulk, automobiles and passengers are handled at Indira dock and Ballard Pier.

3.5.1 DETAILS OF EXISTING FACILITIES

The port is geographically spread into different areas based on the type of cargo to be handled.

- Main Harbour in Colaba area – for handling dry bulk, breakbulk, general cargo, automobiles
- Jawahar Dweep (Butcher Island) – for handling Crude and POL products
- Pir Pau – for handling chemicals

Mumbai port was handling coal at Haji Bunder and this has recently been discontinued due to environmental considerations. The Princess & Victoria Docks in the Main Harbor have been closed and filled up to create stackyard for containers.



3.5.2 BERTHING FACILITIES

(a) Indira Dock

The Indira dock works on a lock-gate system with a lock length of 228.6 m and a width of

30.5 m, through which vessels can enter and leave the docks at any state of tide. There are 21 berths inside the basin and 5 berths along the harbour wall. The design depth available inside dock and at outside berths is 8.8 m and 7.5 m, respectively. The depth of berths inside the basin can be further increased by 1.2 m by impounding water by electric pumps.

As can be seen from the figures, berths 1 to 17 are inside the dock basin and berths 18 to 23 are outside along the dock wall. Inside berths 5 to 8 are leased to Cochin Shipyard Ltd and are not used for handling cargo. The principal cargo handled are steel, sugar, yellow peas, fertilizers, project cargo, cars and containers. There are 12 sheds with a total area of 76,740 m2. There are three 16 T electric Wharf Cranes serving Berth 2, 3 and 4 of the dock.

(b) Ballard Pier Berths

There are two berths on the southward extension of Indira Dock named Ballard Pier. The Ballard Pier Extension (BPX) and the Ballard Pier Mole Station (BPS) are the two berths. The BPX has a modern passenger terminal building which houses check-in baggage facilities, a lounge, duty-free shop, curios and handicraft stalls, toilets etc.

(c) Jawahar Dweep Marine Oil Terminal

For handling Crude oil and Petroleum products, there are four jetties at Jawahar Dweep (Butcher Island). The layout of Jawahar Dweep with the four oil jetties are shown in figure here under. While JD 1, JD 2 and JD 3 were commissioned first during 1950s, JD 4 was commissioned during 1980s. The first three jetties can handle panamax tankers and JD 4 can handle suez max tankers dead freighted to the permissible draft.

d) PirPau Chemical Terminal

All Chemicals and LPG are handled at the two berths at Pir pau. These are located at the northern extremity of the harbour's deep waters. While the old jetty is nearer to the shore, the new jetty, constructed during 1996, is located about 2 km offshore of the old one. The location of Pir Pau berths along with the tankage terminal onshore .

(E) Offshore Container Terminal

This is the first and single largest container privatization project at the Mumbai Port. The Project involves construction, financing, equipping, operations, and management of the offshore container terminal, comprising at least two berths in the Mumbai Harbour on a BOT basis. It is expected to handle about 1 million TEUs at the offshore container facility.

3.5.3 STORAGE

Extensive facilities are available for storage of cargo in the docks and outlying areas. The new sheds have been designed on modern lines with a steel frame and wall of pre-cast concrete blocks. The column spacing has been kept wide enough to allow the use of mobile cranes, forklifts and other cargo handling equipment's.

Warehousing accommodation is available for storage of goods which are in the process of despatch either within Mumbai and its suburbs or to the hinterland of the Port. Pre-shipment storage facilities have been accorded to all types of export cargoes such as sugar, oil cakes, iron and steel etc.

Storage Area	Covered	Open	Slots
Indira Dock	76862	180349	622
Victoria Dock	2602	13303	...
Prince's Dock	10201	10658	...
Container Freight Stations	57227	62987	5579
Empty Container Yards	...	139367	...
Warehouses	148069	81134	20
Total:	294961	487798	6221
Liquid Storage	487800 tonnes approx.		

Table 3.5 Storage of Mumbai Port (in sq. metres)

3.5.4 LAYOUT OF MUMBAI PORT

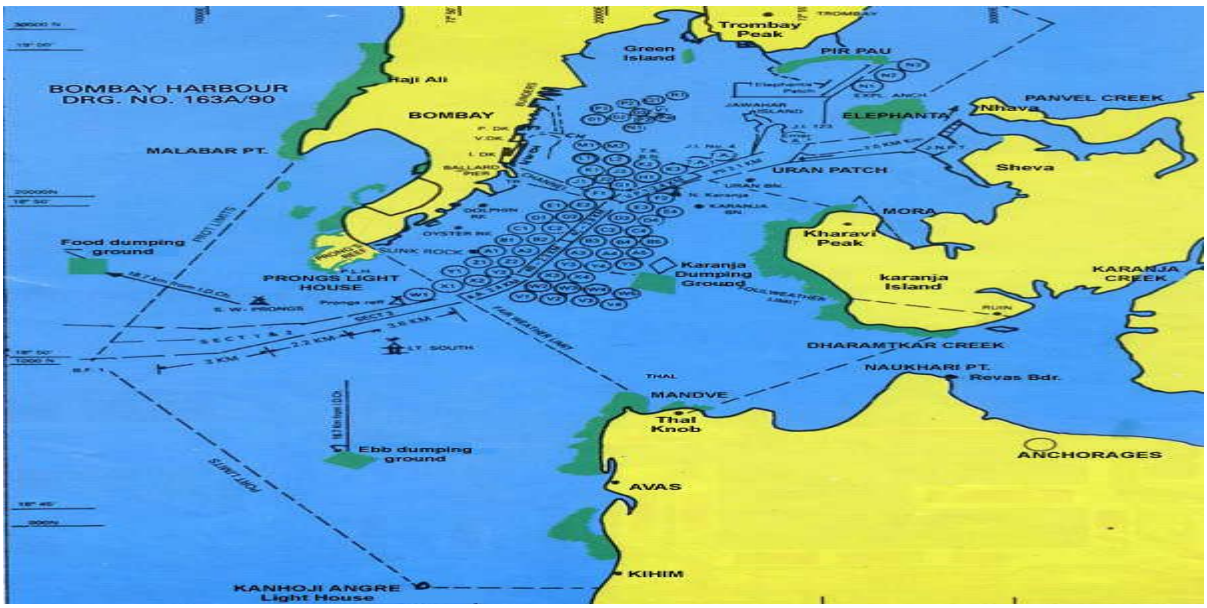


Fig 3.5 Mumbai Port Layout

3.6 DEENADAYAL PORT (KANDLA PORT)

Deendayal Port plays a major role in the country's international trade. Having notched up a string of success, it has emerged as a forerunner, and has carved a niche for itself, by its steady growth and economy of operations.

Deendayal Port continues to be India's no. 1 Port with capacity of 122.5 MMT (2019-20) traffic handling. It has been at top for many consecutive years. Deendayal Port contributes 16.5 % to India's total Major Port handlings. Port has 12 dry cargo berths with total length of 2.57 km in straight line and 6 oil jetties for handling of POL and chemical. The single buoy mooring in Vadinar can handle Very Large Crude Oil Vessel (VLCC) with pumping capacity of 5000 tonne per hour.

3.6.1 LOCATION

Port of Kandla governed by Deendayal Port Authority is located at the west coast of India, is one of the 12 major ports of India and the only Major Port in the state of Gujarat. It was declared as a Major Port on April 8, 1955.

Latitude: 23° 01" N Longitude: 70° 13"E

Deendayal Port is a natural harbor situated in Kandla Creek and is 90 km from the mouth of Gulf of Kutch. Geographically, the port is spread in three locations viz., Kandla, Vadinar and Tuna Tekra.

3.6.2 ADVANTAGE OF DEENDAYAL PORT

- Protected and safe harbour.
- Economical and cost-effective services.
- Facilities for handling Liquid Cargo, POL Products, Chemicals and Edible Oil.
- Storage Facility for LPG to the tune of 30,000 cu.m.
- Port with Highest Liquid Storage capacity in the Country.
- Excellent Road and Rail Connectivity.

- Higher capacity cranes for Dry Cargo.
- Transparent and Notified Tariff.
- 13 mtrs. draft at Deendayal and 33 meters at Vadinar.
- Provides the largest open and closed storage capacity.
- Strategically located with close proximity to the Middle East and Europe
- Port with the largest land availability of 2175 acres of dry land area and 10 km water front.
- Trade-friendly port and excellent industrial relations.
- Nearly 100% payments are now being made online every day.

3.6.3 STORAGE FACILITIES

Deendayal Port offers an excellent and vast Dry Cargo Storage facilities inside the Custom Bonded area for storage of import and export cargoes on very competitive rates.Existing storage facilities for dry cargo within Custom Bonded area:

Existing storage facilities for dry cargo within Custom Bonded area:

SR. NO.	DESCRIPTION	NO.	AREA(SQ. MTRS.)	CAPACITY (IN MTS)
1	Godowns	34	2.01 lakh	6.33 lakh
2	Open areas	-	20.58 lakh	48.28 lakhs

Storage facilities for dry cargo outside Custom Bonded area

SR. NO.	DESCRIPTION	NO.	AREA(SQ. MTRS.)	CAPACITY (IN MTS)
1	Godowns	35	-	1.33 lakh

Storage facilities for liquid cargo

SR. NO.	DESCRIPTION	NO.OF TANKS	CAPACITY (IN KL)
1	Private Sector Storage Terminals		12.53 lakh
2	Public Sector & Co-operative		11.22 lakh
		Total	**23.75 lakh**

Table 3.6 Storage of Kandla Port

3.6.3 LAYOUT OF KANDLA PORT

Fig 3.6 Kandla Port Layout

CHAPTER 4

ANALYSIS & INTERPRETATION

4.1 COLLECTION OF DATA

4.1.1 MAJOR PORTS: CARGO TRAFFIC IN TERMS OF OVERSEAS AND COASTAL TRAFFIC

S No.	Name of Ports		Mar-18		Mar-19		(April-March 2018 2019)		(April-March 2019 2020)		% change {(col.10 / col.8-
			Cargo Handled	% share	Cargo Handled	% share	Cargo Handled	% share	Cargo Handled	% share	
1	2	3	4	5	6	7	8	9	10	11	12
1	Kolkata	Overseas	3822	8.5	3482	8	7570	8.7	6433	7.3	-15
		Coastal	1353	9.2	2181	14	2451	8.5	4182	13.6	70.6
		Total	5175	8.7	5663	9.6	10021	8.6	10615	8.9	5.9
2	KDS	Overseas	1239	2.8	1240	2.9	2375	2.7	2504	2.8	5.4
		Coastal	302	2.1	308	2	526	1.8	599	1.9	14
		Total	1541	2.6	1548	2.6	2901	2.5	3103	2.6	7
3	HDC	Overseas	2583	5.8	2242	5.2	5195	5.9	3929	4.4	-24.4
		Coastal	1051	7.2	1874	12	1926	6.7	3583	11.6	86.1
		Total	3633	6.1	4116	7	7120	6.1	7512	6.3	5.5
		Overs	6011	13.4	5924	13.6	1064	12.2	1230	13.9	15.6

4	Paradip	eas					2		2		
		Coastal	3268	22.3	3012	19.3	66789	23.6	617	20.1	-8.9
		Total	9279	15.6	8937	15.1	17431	15	18489	15.5	6.1
5	Vizag	Overseas	3921	8.8	4139	9.5	7558	8.6	8406	9.5	11.2
		Coastal	1546	10.6	1549	9.9	3040	10.6	2973	9.6	-2.2
		Total	5468	9.2	55689	9.6	10598	9.1	1179	9.5	7.4
6	Kamaraj ar	Overseas	1525	3.4	1891	4.4	26613		3433	3.9	29
		Coastal	1602	10.9	1116	7.1	3396	11.8	2552	8.3	-24.9
		Total	3127	5.3	3008	5.1	6058	5.2	5985	5	-1.2
7	Chennai	Overseas	3982	8.9	3870	8.9	7805	8.9	7389	8.4	-5.3
		Coastal	353	2.4	361	2.3	764	2.7	789	2.6	3.4
		Total	435	7.3	4231	7.2	8568	7.4	8179	6.9	-4.5
8	Chidamb aranar	Overseas	2088	4.7	195	4.5	4229	4.8	4158	4.7	-1.7
		Coastal	889	6.1	98	6.3	1781	6.2	1868	6.1	4.9
		Total	2977	5	2943	5	6011	5.2	6027	5.1	0.3

9	Cochin	Overseas	1854	4.1	1768	4.1	3632	4.2	3831	4.3	5.5
		Coastal	866	5.9	1102	7	1490	5.2	1867	6.1	25.3
		Total	2720	4.6	2870	4.9	5122	4.4	5698	4.8	11.2
10	New Mangalore	Overseas	24438	5.4	2104	4.8	5279	6	489	5.5	-7.2
		Coastal	58	4	746	4.8	1304	4.5	1220	4	-6.4
		Total	3020	5.1	2849	4.8	6583	5.7	6117	5.1	-7.1
11	Marmagao	Overseas	1694	3.8	1650	3.8	3978	4.5	3000	3.4	-24.6
		Coastal	330	2.3	141	0.9	374	13	270	0.9	-27
		Total	2024	3.4	1791	3	4351	3.7	3271	2.7	-24.8
12	Mumbai	Overseas	2910	6.5	3023	7	583	6.7	5859	6.6	0.4
		Coastal	2270	15.5	2316	14.8	4324	15	4482	14.5	3.7
		Total	5180	8.7	5339	9	10157	8.7	10341	8.7	1.8
13	JNPT	Overseas	5459	12.2	5672	13.1	11017	12.6	113333	12.8	2.9
		Coastal	349	2.4	342	2.2	684	2.4	674	2.2	-1.6
		Total	5807	9.8	6014	10.2	11702	10.1	12007	10.1	2.6
14	KPT/DPT	Overseas	9097	20.3	7981	18.4	17277	19.7	17301	19.6	0.1
		Coastal	1235	8.4	1777	11.4	2378	8.3	3758	12.2	58
		Total	10332	17.4	9758	16.5	19655	16.9	21059	7.7	7.1
Total		**Overseas**	**44801**	**100**	**43460**	**100**	**87480**	**100**	**88342**	**100**	**1**
		Coastal	**14644**	**100**	**15631**	**100**	**28777**	**100**	**30823**	**100**	**7.1**
		Total	**59445**	**100**	**59091**	**100**	**116258**	**100**	**119165**	**100**	**2.5**

Source: Port data management portal-Ministry of shipping

Table 4.1: major port wise monthly cargo traffic (2019-2020)

4.1.2 MAJOR PORTS-PORT-WISE MONTHLY CARGO TRAFFIC HANDLED

(In '000 Tonnes)

S. No.	Name of Ports		January, 2020		January, 2021 (P)		(April-January, 2019-20)		(April-January, 2020-21) (P)		% Change {(Col.10/ Col.8-1) *100}
			Cargo handled	% share	Cargo handled	% share	Cargo handled	% share	Cargo handled	% share	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
1	SPM Kolkata	Overseas	4756	10.1	5864	11.7	37761	8.4	43473	10.3	15.1
		Coastal	1158	7.9	372	2.6	15246	11.0	5587	4.7	-63.4
		Total	5913	9.6	6236	9.7	53008	9.0	49060	9.1	-7.4
	KDS	Overseas	1059	2.3	1619	3.2	12181	2.7	11601	2.7	-4.8
		Coastal	221	1.5	65	0.5	2434	1.8	311	0.3	-87.2
		Total	1280	2.1	1684	2.6	14615	2.5	11912	2.2	-18.5
	HDC	Overseas	3697	7.9	4244	8.4	25580	5.7	31872	7.5	24.6
		Coastal	937	6.4	308	2.2	12812	9.3	5276	4.4	-58.8
		Total	4633	7.5	4552	7.1	38392	6.5	37148	6.9	-3.2
2	Paradip	Overseas	6765	14.4	8151	16.2	64258	14.3	69473	16.4	8.1
		Coastal	3005	20.4	3015	21.4	29128	21.1	24135	20.3	-17.1
		Total	9769	15.9	11166	17.3	93386	15.9	93608	17.3	0.2
3	Vizag	Overseas	5733	12.2	4596	9.1	46905	10.5	44434	10.5	-5.3
		Coastal	1466	10.0	1546	11.0	13834	10.0	13657	11.5	-1.3
		Total	7199	11.7	6142	9.5	60739	10.4	58090	10.7	-4.4
4	Kamarajar	Overseas	1527	3.3	1303	2.6	15341	3.4	10984	2.6	-28.4
		Coastal	1602	10.9	1168	8.3	11212	8.1	8679	7.3	-22.6
		Total	3129	5.1	2471	3.8	26554	4.5	19664	3.6	-25.9
5	Chennai	Overseas	3418	7.3	3691	7.3	35712	8.0	30245	7.2	-15.3
		Coastal	551	3.7	553	3.9	4092	3.0	4497	3.8	9.9
		Total	3969	6.4	4244	6.6	39804	6.8	34742	6.4	-12.7
6	V.O.C.	Overseas	2305	4.9	1956	3.9	22645	5.1	17622	4.2	-22.2
		Coastal	724	4.9	855	6.1	7285	5.3	8796	7.4	20.7
		Total	3029	4.9	2810	4.4	29930	5.1	26419	4.9	-11.7
7	Cochin	Overseas	2045	4.4	2067	4.1	18946	4.2	15783	3.7	-16.7
		Coastal	971	6.6	1213	8.6	9074	6.6	8891	7.5	-2.0
		Total	3016	4.9	3281	5.1	28020	4.8	24674	4.6	-11.9
8	New Mangalore	Overseas	2406	5.1	2134	4.2	23394	5.2	20647	4.9	-11.7
		Coastal	909	6.2	988	7.0	7871	5.7	8265	7.0	5.0
		Total	3314	5.4	3122	4.8	31265	5.3	28913	5.3	-7.5
9	Mormugao	Overseas	1507	3.2	2474	4.9	12118	2.7	16151	3.8	33.3
		Coastal	132	0.9	192	1.4	1298	0.9	1046	0.9	-19.4
		Total	1640	2.7	2665	4.1	13417	2.3	17197	3.2	28.2
10	Mumbai	Overseas	2759	5.9	2763	5.5	29098	6.5	23647	5.6	-18.7
		Coastal	2392	16.2	2267	16.1	22249	16.1	19416	16.3	-12.7
		Total	5151	8.4	5030	7.8	51347	8.8	43063	7.9	-16.1
11	JNPT	Overseas	5552	11.8	5884	11.7	53299	11.9	47471	11.2	-10.9
		Coastal	360	2.4	612	4.4	3475	2.5	3761	3.2	8.2
		Total	5913	9.6	6496	10.1	56775	9.7	51232	9.5	-9.8
12	KPT/DPT	Overseas	8101	17.3	9439	18.8	88480	19.8	82943	19.6	-6.3
		Coastal	1451	9.9	1281	9.1	13486	9.8	12151	10.2	-9.9
		Total	9552	15.5	10720	16.7	101965	17.4	95094	17.6	-6.7
Total		**Overseas**	**46873**	**76.1**	**50321**	**78.2**	**447959**	**76.4**	**422874**	**78.1**	**-5.6**
		Coastal	**14722**	**23.9**	**14063**	**21.8**	**138251**	**23.6**	**118882**	**21.9**	**-14.0**
		Total	**61594**	**100.0**	**64384**	**100.0**	**586210**	**100.0**	**541756**	**100.0**	**-7.6**

Source: - Port Data Management Portal (PDMP), Ministry of Ports, Shipping & Waterways P-Provisional

Table 4.2: Major port-wise monthly cargo traffic (2020-2021)

- At a broad commodity level, Food grain excluding Pulses recorded the highest growth in traffic during April-January, 2020-21 at 58.4% followed by Sugar (57.0%), Iron Ore (26.1%), Pulses (20.6%), FRM-Dry (13.9%), Other Ores and LPG/LNG (10.9%) each, Iron & Steel (10.4%), Fertilizer (6.0%) and FRM-Liquid (3.2%). Project cargo recorded the highest negative growth of 42.8% followed by Cement (23.4%), POL-Products (22.8%), Thermal Coal (15.5%), Edible Oil (13.6%), Other Commodities (12.7%), POL Crude (11.5%), Coking Coal and Other Coal (10.6%) each and Container (7.2%) over April-January, 2019-20.

- Amongst all the commodities, Container handled the maximum cargo of 114.23 million tonnes with a share of 21.1% followed by POL-Crude (20.5%), Iron ore (10.6%), Thermal coal (10.4%), Others commodities (8.8%), POL Products (8.1%), Coking coal (5.5%), Other coal (3.6%), LPG/LNG (2.2%), Fertilizer (1.7%), Iron & Steel and Edible oil (1.6%) each, FRM Dry (1.2%), FRM liquid (1.0%), Other Ore (0.8%), Sugar (0.6%), Cement (0.5%), Food grains excluding Pulses (0.2%) and Project Cargo (0.1%) during April- January, 2020-21

4.1.3 CARGO TRAFFIC HANDLED DURING APRIL-JANUARY, 2020-21

- During April-January, 2020-21, Mormugao Port recorded highest growth of 28.2% in traffic handled at Major Ports followed by Paradip Port (0.2%). Major ports that recorded negative growth in traffic during April-January, 2020-21 were: Kamarajar Port (25.9%), SPM Kolkata Dock System (18.5%), Mumbai Port (16.1%), Chennai Port (12.7%), Cochin Port (11.9%), VOC Port (11.7%), JNPT (9.8%), NMPT (7.5%), Deendayal Port (6.7%), Vizag Port (4.4%) and SPM Haldia Dock Complex (3.2%) over April-January, 2019-20.

- Amongst the Major Ports, Deendayal Port handled the maximum Cargo of 95.09 million tonnes with a share of 17.6% followed by Paradip Port (17.3%), Vizag Port (10.7%), JNPT (9.5%), Mumbai Port (7.9%), SPM Haldia Dock Complex (6.9%), Chennai Port (6.4%), NMPT (5.3%), VOC Port (4.9%), Cochin Port (4.6%), Kamarajar Port (3.6%), Mormugao Port (3.2%), and SPM Kolkata Dock System (2.2%) during April-January, 2020-21.

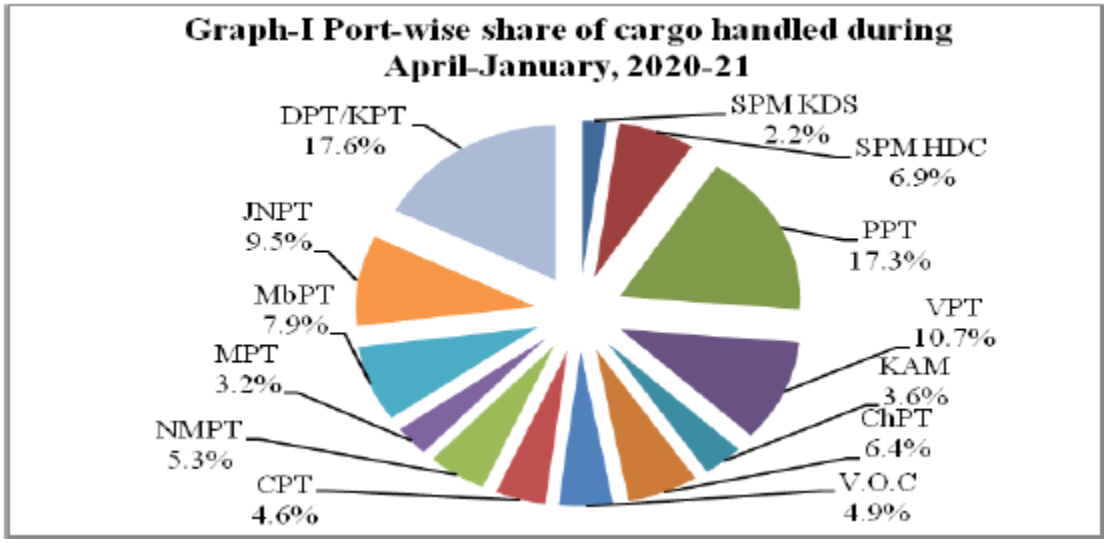


Fig 4.1 Port wise share of cargo handled during April-January 2020-2021

4.1.4 OVERSEAS AND COASTAL CARGO TRAFFIC HANDLED DURING APRIL-JANUARY, 2020-21

- Amongst the Major Ports, Deendayal Port handled the maximum Overseas Cargo of 82.94 million tonnes with a share of 19.6% followed by Paradip Port (16.4%), JNPT (11.2%), Vizag Port (10.5%), SPM Haldia Dock (7.5%), Chennai Port (7.2%), Mumbai Port (5.6%), NMPT (4.9%), VOC Port (4.2%), Mormugao Port (3.8%), Cochin Port (3.7%), SPM Kolkata Dock (2.7%) and Kamarajar Port (2.6%) during April-January, 2020-21 (Graph II).

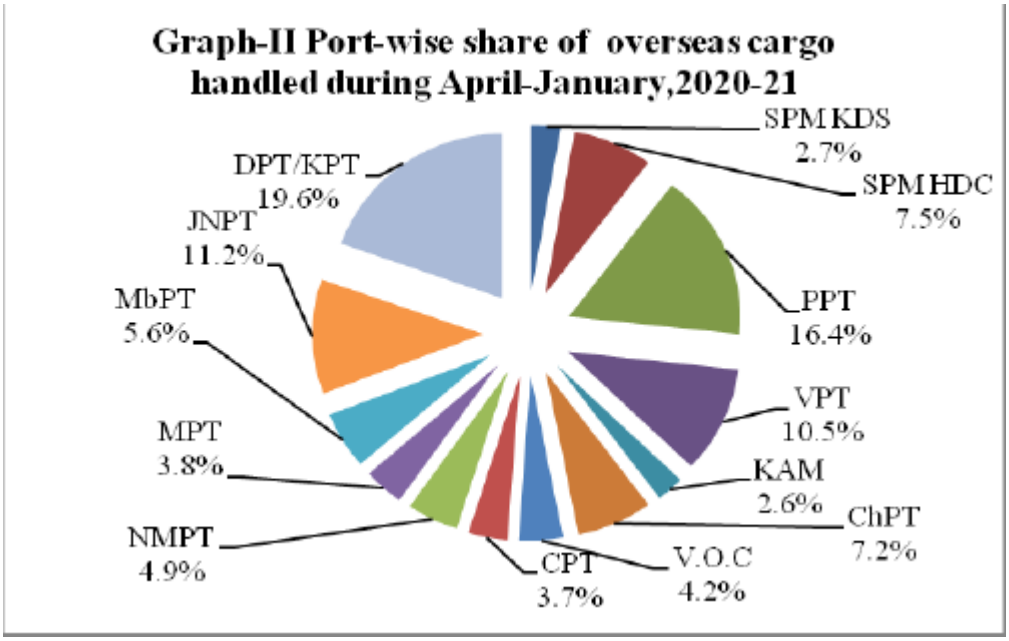


Fig 4.2 Port wise share of overseas cargo handled during April-January 2020-2021

- Amongst the Major Ports, Paradip Port handled the maximum Coastal Cargo of 24.14 million tonnes with a share of 20.3% followed by Mumbai Port (16.3%), Vizag Port (11.5%), Deendayal Port (10.2%), VOC Port (7.4%), Cochin Port (7.5%), Kamarajar Port (7.3%), NMPT (7.0%), SPM Haldia Dock (4.4%), Chennai Port (3.8%), JNPT (3.2%), Mormugao Port (0.9%) and SPM Kolkata Dock (0.3%) during April-January, 2020-21 (Graph III).

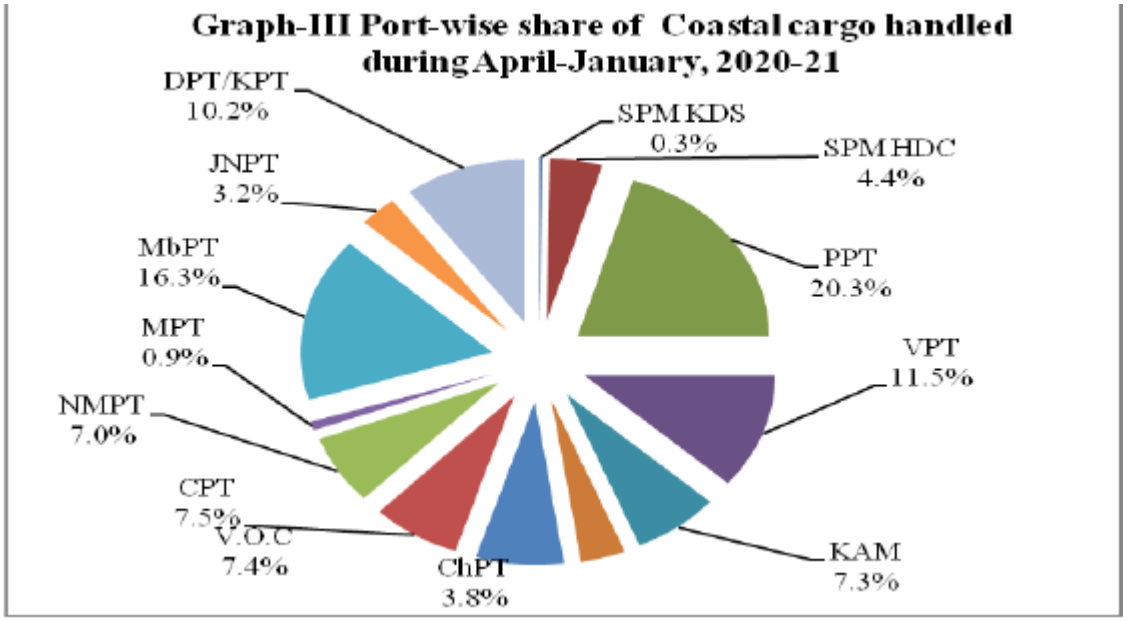


Fig 4.3 port wise share of coastal cargo handled during April-January 2020-2021

4.1.5 CONTAINER TRAFFIC

Table-8 Major Port-wise Container Traffic Handled (in 000' tonnes & 000' TEUs)				
Name of Port	2019-20		2020-21	
	000' Tonnes	000' TEUs	000' Tonnes	000' TEUs
SMP (Kolkata D.S)	9767	675	8237	538
SMP (Haldia D.C)	3032	169	2927	149
Paradip	222	12	279	16
Vishakhapatnam	8649	409	8178	481
Kamarajar	2524	128	3871	198
Chennai	26710	1384	26768	1387
V.O.Chidambaranar	16436	804	15023	762
Cochin	8628	620	9550	690
New Mangalore	2278	153	2291	150
Mormugao	418	32	307	22
J.L.Nehru	60940	5031	57746	4677
Mumbai	291	27	255	25
Deendayal	6967	447	8279	515
All Ports	**146861**	**9892**	**143710**	**9610**

Table 4.3 major port wise container traffic handled

4.1.6 MAJOR PORTS AVERAGE PRE-BERTHING DETENTION

Table 10 : Average Pre-Berthing Detention(Days)								
Port	**1990-91**	**2000-01**	**2015-16**	**2016-17**	**2017-18**	**2018-19**	**2019-20**	**2020-21**
1	2	3	4	5	6	7	8	9
SMP Kolkata D.S	0.9	0.61	0.50	0.57	0.62	0.46	0.70	0.51
SMP Haldia D.C	1.66	0.91	0.66	2.49	3.15	2.72	2.96	2.71
Paradip	1.59	1.41	2.05	2.47	0.87	0.30	0.64	0.26
Vishakhapatnam	1.83	0.75	1.47	1.22	2.37	1.29	0.05	0.05
Kamarajar			4.73	0.96	0.57	0.18	0.12	0.08
Chennai	2.1	2.45	0.44	0.38	0.86	0.15	0.00	0.00
V.O.Chidambaranar	0.9	1.4	1.33	1.80	1.13	0.68	0.65	0.50
Cochin	0.83	0.74	0.66	0.48	0.43	0.53	0.48	0.64
New Mangalore	0.79	0.77	0.76	0.62	1.16	1.10	1.26	1.09
Mormugao**	2.51	1.32	1.38	1.67	1.31	1.24	1.21	1.26
J.L.Nehru		0.67	1.17	0.77	0.92	0.82	0.77	0.91
Mumbai	3.4	1.26	1.27	0.46	0.96	1.07	0.16	0.10
Deendayal	4.4	1.51	1.98	2.02	1.90	2.02	1.85	2.81
All Ports	**2.16**	**1.19**	**1.31**	**1.27**	**1.39**	**1.10**	**0.95**	**1.04**
** Relate to dry bulk cargo for MOHP(Mech.) and Berth No. 10 &11 (Conv.)								

Table 4.4 Major Ports Average Pre-berthing Detention

4.1.7 AVERAGE TURN-ROUND TIME (TRT)

Port	**1990-91**	**2000-01**	**2015-16**	**2016-17**	**2017-18**	**2018-19**	**2019-20**	**2020-21**
1	2	3	4	5	6	7	8	9
SMP Kolkata D.S	11.90	5.50	4.78	4.43	3.77	3.35	3.17	2.13
SMP Haldia D.C	6.47	3.97	3.27	5.47	3.75	3.03	2.75	2.91
Paradip	8.40	4.16	4.50	4.99	3.31	2.51	2.34	2.42
Vishakhapatnam	7.07	3.71	3.84	3.75	2.58	2.51	2.43	2.75
Kamarajar	-	-	6.87	2.68	2.19	1.97	1.73	1.79
Chennai	7.20	5.83	2.53	2.51	2.21	1.98	2.00	2.14
V.O.Chidambaranar	4.70	4.10	3.53	4.00	2.40	1.76	1.67	1.70
Cochin	4.00	3.11	2.18	1.99	1.87	1.94	1.45	1.49
New Mangalore	4.96	2.89	2.63	2.35	2.04	1.93	1.90	1.98
Mormugoa *	6.40	4.25	3.37	3.43	3.15	3.48	2.33	2.41
J.L.Nehru	-	2.21	2.31	1.96	2.23	2.13	1.23	1.19
Mumbai	10.80	5.20	3.29	2.48	2.76	2.69	1.70	2.07
Deendayal	10.00	4.72	4.28	4.51	4.25	4.68	2.54	2.59
All Ports	8.10	4.24	3.51	3.48	2.91	2.73	2.12	2.18
* Refers to dry bulk cargo for MOHP(Mech.) and Berth No. 10 &11 (Conv) From 2018-19 as per new definition f TRT ; from pilot boarding to de-boarding.								
Source: Major Ports								

Table 4.5: Average Turn Round Time

4.1.8 AVERAGE OUTPUT PER SHIP-BERTH-DAY

(Tonnes)

Port	1990-91	2000-01	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21
1	2	3	4	5	6	7	8	9
SMP Kolkata D.S	560	2305	3201	6080	6962	7765	7174	8210
SMP Haldia D.C	5659	6384	9126	12537	13832	15083	15192	14243
Paradip	4082	8503	26965	30245	33440	36030	32001	30224
Visakhapatnam	5325	9799	17179	16823	17592	18281	20032	17238
Kamarajar	-	-	31106	26235	28456	27678	26581	23945
Chennai	3912	6977	18976	19220	19113	21001	20340	20331
V.O.Chidambaranar	2130	3983	13619	13612	15557	19494	19334	19302
Cochin	3714	6138	20962	23539	28143	30150	31258	30915
New Mangalore	4412	12192	16165	17094	16378	18126	19140	19048
Mormugao*	10429	12438	21542	30414	24948	18685	19944	24305
J.L.Nehru	-	6383	23792	23897	22526	25847	28296	27711
Mumbai	2310	4213	18020	20915	22996	25941	25608	23659
Deendayal	4417	8230	16538	18235	22903	21373	21109	10467
All Ports	**3372**	**6961**	**16471**	**19080**	**20581**	**21839**	**21914**	**19171**
*Relate to dry bulk cargo for MOHP(Mech.) and Berth No. 10 &11 (Conv.)								

Table 4.6: Average Output per Ship –Berth-Day

4.2 ANALYSIS AND INTERPRETATION

4.2.1 WEST COAST MAJOR PORT TRAFFIC HANDLED

WEST COAST MAJOR PORT TRAFIC HANDLED (IN '000 TONNES)

S NO.	NAME OF PORTS		MAY-18		MAY-19		(APRIL-MAY 2018-2019)		(APRIL-MAY 2019-2020)		% CHANGE
			CARGO HANDLE	% SHARE	CARGO HANDLE	% SHARE	CARGO HANDLE	% SHARE	CARGO HANDLE	% SHARE	
1	2	3	4	5	6	7	8	9	10	11	12
1	COCHIN	OVERSEAS	1854	4.1	1768	4.1	3632	4.2	3831	4.3	5.5
		COASTAL	866	5.9	1102	7	1490	5.2	1867	6.1	25.3
		TOTAL	2720	4.6	2870	4.9	5122	4.4	5698	4.8	11.2
2	NEW MANGALORE	OVERSEAS	2438	5.4	2104	4.8	5279	6	489	5.5	-7.2
		COASTAL	58	4	746	4.8	1304	4.5	1220	4	-6.4
		TOTAL	3020	5.1	2849	4.8	6583	5.7	6117	5.1	-7.1

	MARMAGAO	OVERSEAS	1694	3.8	1650	3.8	3978	4.5	3000	3.4	-24.6
		COASTAL	330	2.3	141	0.9	374	13	270	0.9	-27
		TOTAL	2024	3.4	1791	3	4351	3.7	3271	2.7	-24.8
4	MUMBAI	OVERSEAS	2910	6.5	3023	7	583	6.7	5859	6.6	0.4
		COASTAL	2270	15.5	2316	14.8	4324	15	4482	14.5	3.7
		TOTAL	5180	8.7	5339	9	10157	8.7	10341	8.7	1.8
5	JNPT	OVERSEAS	5459	12.2	5672	13.1	11017	12.6	11333	12.8	2.9
		COASTAL	349	2.4	342	2.2	684	2.4	674	2.2	-1.6
		TOTAL	5807	9.8	6014	10.2	11702	10.1	12007	10.1	2.6
6	KPT/DPT	OVERSEAS	9097	20.3	7981	18.4	17277	19.7	17301	19.6	0.1
		COASTAL	1235	8.4	1777	11.4	2378	8.3	3758	12.2	58
		TOTAL	10332	17.4	9758	16.5	19655	16.9	21059	7.7	7.1
Total		**Overseas**	23452	100	22198	100	41766	100	41813	100	-22.9
		Coastal	5108	100	6424	100	10554	100	12271	100	52
		Total	29083	100	28621	100	57570	100	58493	100	-9.2

% change {(col.10/col.8-1)*100}

Table 4.7: West coast major port traffic

- In April- may (2019-2020) the average costal cargo handled by west coast Major port were 12271 tonnes. Which is 16.7% more than the previous year. The average growth in overseas cargo handled by west coast ports is16.7%.
- Indian west coast major port contribution in terms of overseas cargo handled by all major ports in India is52.12%.
- Total overseas cargo handled by west coast major port in April- march (2018-2019) is 41813 tonnes which is the 35% of the total cargo handled by all major ports or India.
- In April- march (2018-2019) the average overseas cargo handled by west coast major port were 41766 tonnes. Which is 2% less than the previous year. The average decline in overseas cargo handled by west coast ports is 2%.
- Total costal cargo handled by west coast major port in April- march (2018- 2019) is 10554 tonnes which is the 36.6% of the total cargo handled by all major ports or India.

- Deendayal port has the highest share in terms of overseas cargo handled by west coast major port of India which is 19.6%. With 17301 tonnes of cargo. Followed by JNPT 12.80 % (11333 tonnes), Mumbai 6.6 % (5859 tonnes), New Mangalore 5.5% (489 tonnes), Cochin port 4.3 %(3831 tonnes), Marmugao Port 3.40 %(3000 tonnes).

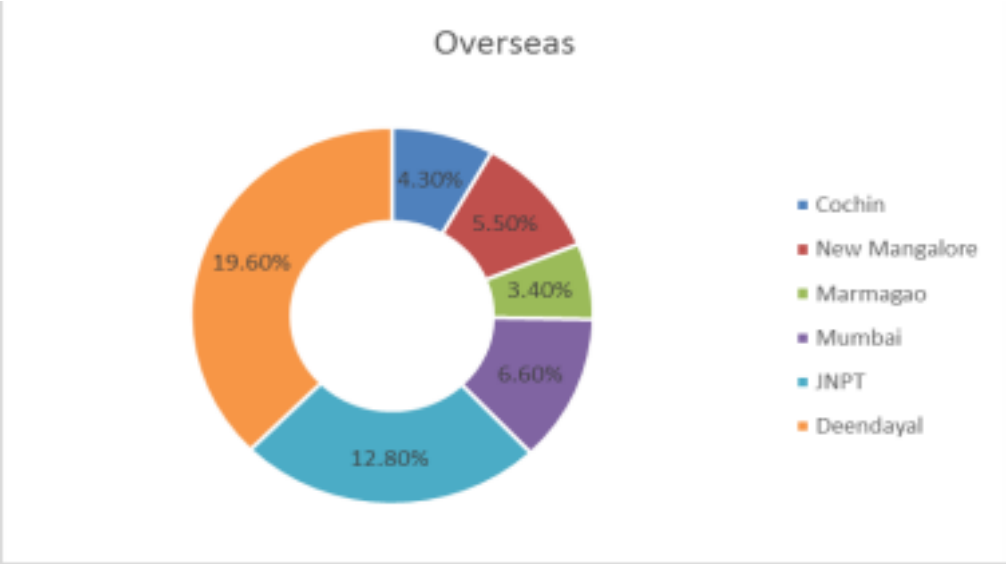


Fig 4.4 Overseas cargo handled by west coast major port of india

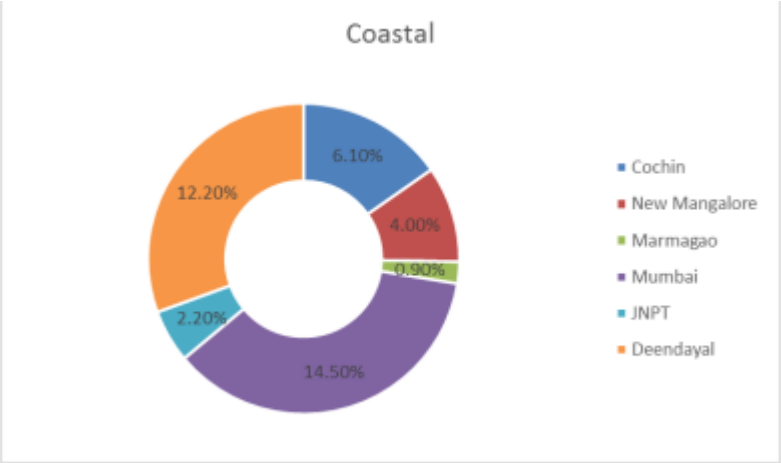


Fig 4.5: Coastal movment by all major ports

- In terms of costal movement by all major ports Mumbai port has 14.50% of cargo followed by other west coast major port, Deendayal port 12.20%, Cochin port 6.10%, New Mangalore port 4%, JNPT 2.20%, Marmugao port 0.90%.
- In terms of value Mumbai has 4482 tonnes of cargo in costal movement of cargo followed by Deendayal port 3758 tonnes, Cochin port 1867 tonnes, New Mangalore port 1220 tonnes, JNPT 674 tonnes, and Marmugao port 270 tonnes.
- When we see the performance in terms of costal and overseas together then the following graph indicate the performance or all major ports of Indian west coast.

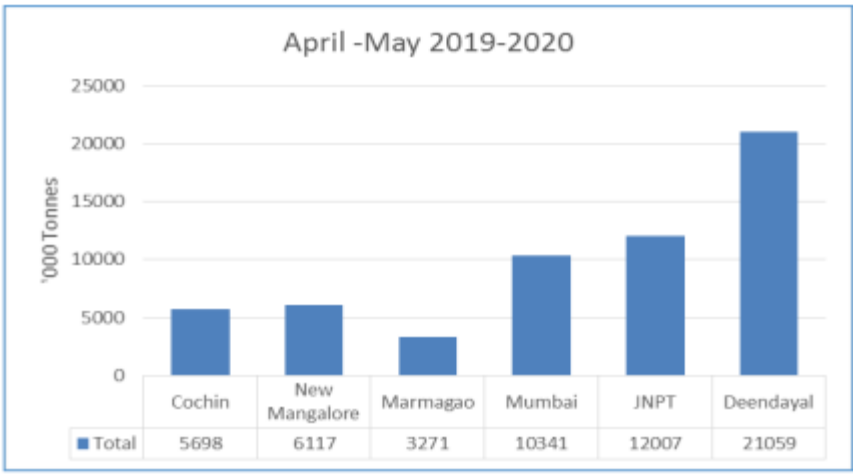


Fig 4.6 Coastal and overseas cargo handled

- Deendayal port has handled the highest cargo of 21059 tonnes in the year of 2019-2020 (April-may)
- Followed by Deendayal port JNPT with 12007 tonnes, Mumbai port 10341, New Mangalore port 6117 tonnes, Cochin port 5698 tonnes, Marmugao port 13271 tonnes.

4.2.2 ANALYSIS OF WEST COAST MAJOR PORT CONTAINER TRAFFIC HANDLED ANALYSIS

WEST COAST MAJOR PORT CONTAINER TRAFFIC HANDLED IN TONNES & TEU'S						
NAME OF PORT	2018-19		2019-20		% CHANGE	
	000'TON NES	TEUS	000'TON NES	TEUS	000'TON NES	TEUs
Cochin	8115	595	8628	620	6.32	4.2
New Mangalore	1920	132	2277	153	18.5	15.9
Mormugao	467	37	417	32	-10.7	13.5
J.L.Nehru	62114	5133	60940	5031	-1.89	-2.02
Mumbai	329	27	290	27	-11.8	0
Deendayal	3959	244	7019	446	77.2	82.7
ALL PORTS	**76904**	**6168**	**79571**	**6309**	**3.46**	**2.2**
TOTAL CONTAINER TRAFFIC(ALL MAJOR PORTS)	**145451**	**9877**	**146933**	**9988**	**10.1**	**11.2**
%SHARE IN CONTAINER TRAFFIC	**11.6**	**62.4**	**54.1**	**63.1**	**34.2**	**19.6**

Table 4.8: West Coast Major Port Container Traffic

- In the year 2018-19 Indian west coast ports handled 76904 (000'tonnes) of container which is 11.6% of total container trade in the year of 2018-19 handled by all major ports of India.
- In the year of 2019-20 all the major port of Indian west coast handled 79571 (000'toones) which is 54.1% of total container trade handled by all major port of India.
- Here is the change in container by west coast major ports with respect to year 2018-20.

Fig. 4.7 Container traffic handled in 2018-19 and 2019-20

- In 2018-19 and 2019-20 JNPT port handled the highest share of container traffic among all the major port of India. The quantity which JNPT handled is 5133("000" TEU's) In the year of 2018-19 and 5031 ("000" TEU's) in the year 2019-20.
- JNPT port has 6.11% growth in terms of TEU handled and 7.4% in terms of tonnes in the year of 2019-20.
- All the major port of Indian west coast has growth in the year of 2019- 20 except Mumbai port.
- Mumbai port fall in container trade the year of2018-19.
- Deendayal has experienced the massive growth rate in container trade in the year of 2019-20. Deendayal port has account 3959 Tonnes in the year of 2018-19 and 7019 tonnes in2019-20.
- Cochin port also account the good number of growth rate in the year of 2019-20 which is 23.1% in terms of TEU's.

4.2.3. AVERAGE TURNAROUND TIME OF WEST COAST PORTS

Average Turnaround Time (days)								
Port	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20
Cochin	1.58	1.76	1.69	2.18	1.99	1.87	1.35	1.46
New Mangalore	3.29	3.18	2.46	2.63	2.35	2.04	1.92	1.93
Marmugoa *	5.06	4.50	3.97	3.37	3.43	3.15	2.62	2.78
J.L.Nehru	2.48	2.26	2.24	2.31	1.96	2.23	2.13	2.12
Mumbai	5.58	4.25	4.09	3.29	2.48	2.76	3.01	2.6
Deendayal	6.33	5.66	4.90	4.28	4.51	4.25	3.01	3.01
Average	4.05	3.60	3.22	3.01	2.78	2.71	2.34	2.31

Table 4.8 Average Turn Round Time of West Coast Ports

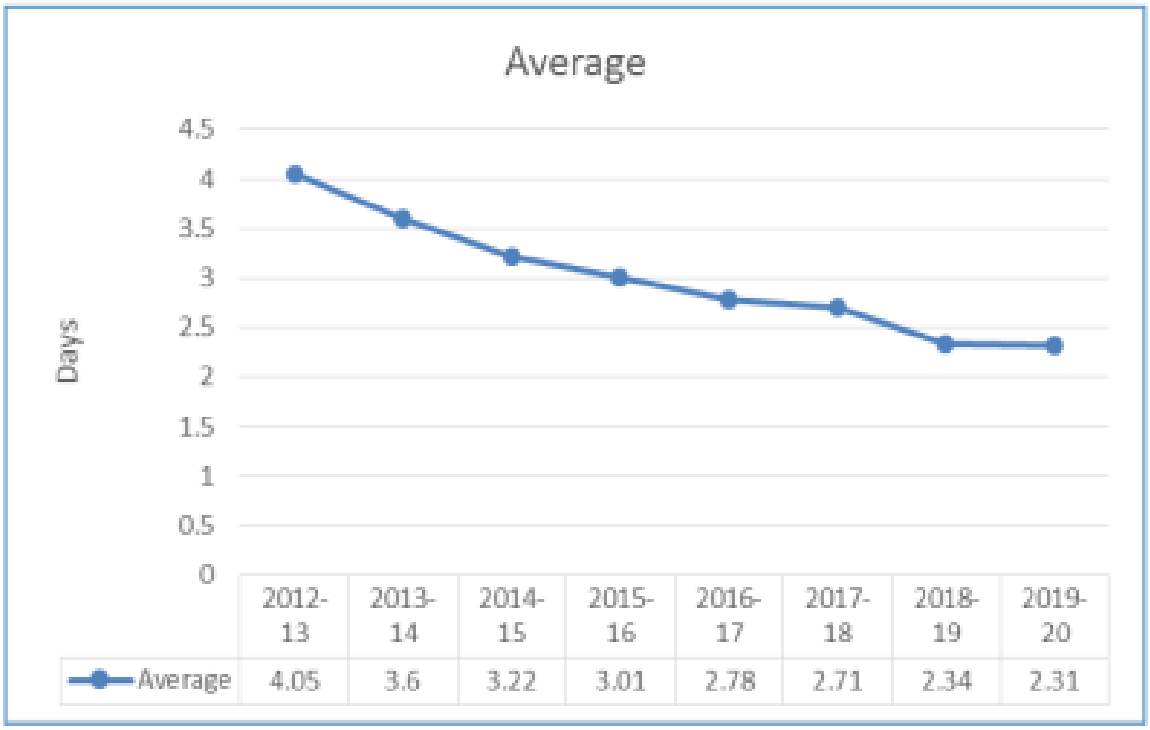


Fig 4.9: Trend in Average Turnaround Time of West Coast Ports.

- In above chart the trend in average turnaround time for a ship at west cost of Indian major ports can be seen.
- From last several years' turnaround time of a ship getting decreased which indicate that ports are getting more efficient year by year in India.
- Above chart shows in the year of 2013-14 the average turnaround time for a ship was 3.6 days where's in the year of 2019-20 turnaround time for a ship is 2.31 days.
- In last 5 years' turnaround time of a ship at west coast major ports has been reduced by 75%.

CHAPTER 5

FINDINGS, SUGGESTIONS & CONCLUSION

5.1 FINDINGS

After doing this study there are few findings for the above study.

- The twelve major ports in India handled about 53.81% of the maritime cargo traffic of the country in 2020-21. Traffic handled at the major ports during last one decade has been increasing over the years except in 2011-12 & 2012-13in tandem with the economic activity and volume of trade turnover. The total traffic handled by the major ports has recorded around 1.2 times increase from 561.1 million tonnes in 2009-10 to672.68 million tonnes in 2020-21(Chart 2).

- Cargo handling capacity at major ports has also risen with traffic. The capacity which was placed at 616.7 million tonnes at the end of 2009-10 has increased to a level of 1514.1 million tonnes at the end of 2018-19 and further increased to 1534.91 million tonnes during 2020-21.

- The capacity addition and the productivity improvements achieved by the major ports coupled with growing participation of Private Sector in cargo handling have had a favourable impact on efficiency of cargo handling operations at India's major ports. The capacity utilization which was 91.0 % in 2009-10, reduced to 45.9% in 2019-20. The capacity utilization at Major ports from 2009-10 to 2020-21 is presented in Chart-3

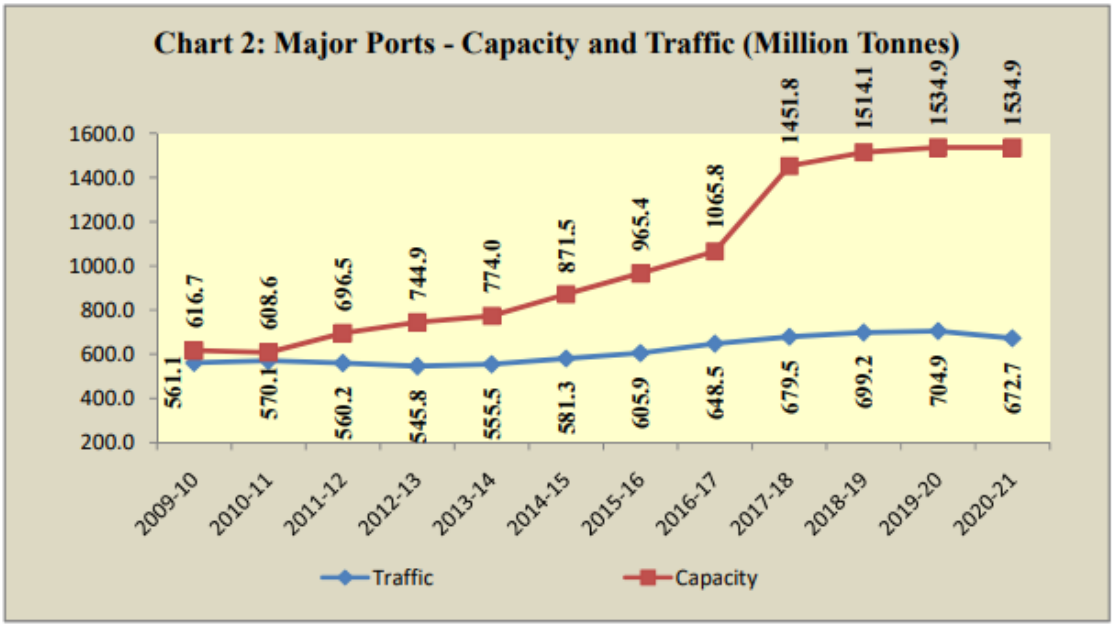


Fig 5.1Major Ports Capacity and Traffic

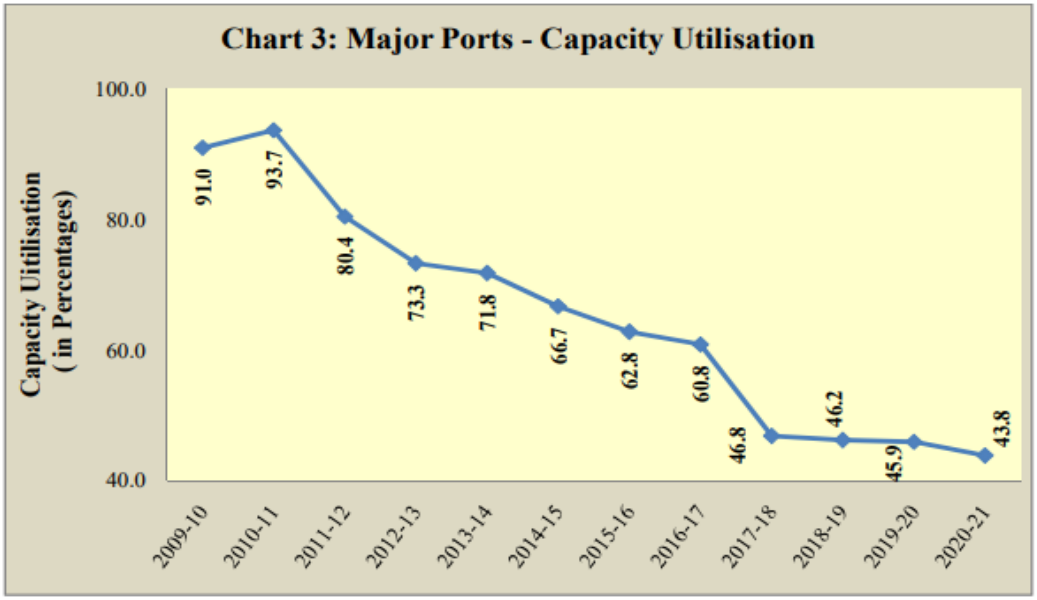


Fig 5.2 Major Ports Capacity Utilisation

- **In terms turnaround time ports position for west coast are following for the year of 2020-2021.**

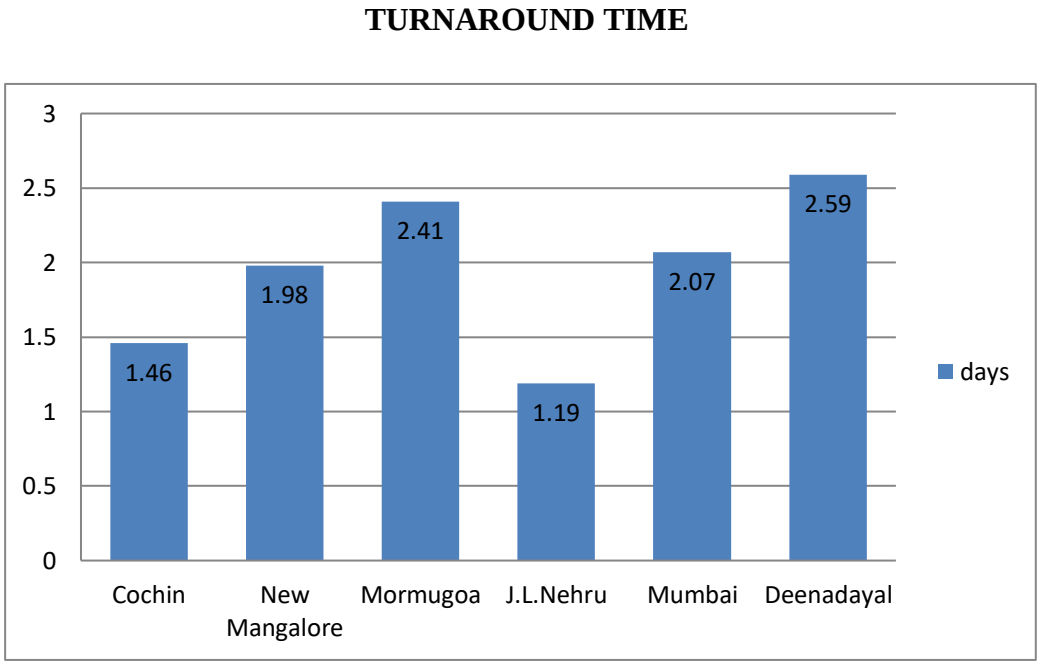


Fig 5.3 Turnaround Time

Table 5.1 Sequence of west coast major ports according to their capacity utilisation

Position	Port	Traffic	capacity	Capacity Utilisation(%)
1	Mumbai	53.32	79	67.5
2	JNPA	64.81	138.87	46.67
3	Deenadayal	117.57	267.1	44.02
4	Cochi	31.5	78.6	40.08
5	New Mangalore	36.5	104.73	34.85
6	Marmogao	21.99	63.4	34.68

Table 5.2 Traffic Handled at west coast major ports by selected commodities- 2020-2021

('000 Tonnes)

Port	POL and Crude Product	Iron Ore	Fertiliser	FRM (Dry)	Food-grains	Coal*	Container Cargo		Others	Total
							000 Tonnes	000 TEUs		
1	2	3	4	5	6	7	8	9	10	11
Deendayal	52866	375	4918	156	1231	19592	8279	515	30149	117566
Mumbai	33226	7175	325	37	0	4513	255	25	7793	53324
J.L.Nehru	2550	0	0	0	0	0	57746	4677	4514	64809
Mormugao	410	7010	163	0	0	9149	307	22	4949	21988
New Mangalore	19109	4729	779	73	0	94	2291	150	9425	36500
Cochin	18553	0	0	256	0	0	9550	690	3145	31503

5.2 SUGGESTIONS

- Deendayal port is more concerned on break bulk cargo.in the year of 2020- 2021 Deendayal port handled 117566(000" tonnes) of total cargo out of that 90% cargo was break bulk .it should move towards container trade because future of shipping trade is container trade because container trade is more economical and fast. Deendayal port should have such container handling equipment's like JNPT so that they can attract more cargo. Investing in infrastructure and equipment's can bring huge capital cost so government should allow private parties under PPP (public private partnership model) to setup their infrastructure on port and government can collect lease from the private parties.

- Jawaharlal Nehru Port Authority (JNPA), India's premier container port, continued its steady surge in cargo handling in 2021 with total container traffic of 5.63 million TEUs (5,631,949 TEUs) as against 4.47 million TEUs (4,474,878 TEUs) in 2020, growth of 25.86% over last calendar year. JNPT port is focused on containers only they also should have such facilities for break bulk this will more cargo to JNPT.

- For Mumbai port last mile connectivity is a problem. Mumbai port should have rail corridor for movement of cargo.it will reduce the problem in last mile connectivity.

- New Mangalore port is also handling more break-bulk cargo in the year of 2020-21 Marmora port handled 36500 (000" tonnes) of cargo out of which only 6.28% cargo comes by container trade. New Mangalore port should have container handling infrastructure that will increase the traffic on port.

- Cochin port has shown a slight decrease in the overall cargo movements during the post Covid pandemic situation itself compared to 2019-20.
  Because the liquid bulk cargo movment c decreased that reflected the total cargo movment.other cargos likes container and dry bulk is slightly increased in this period. The infrastructural availability of the port is underutilized, so maximize utilization of these infrastructural availability and reconstruction and maintance of outdated infrastructure.

- Marmugao port shown increase in overall cargo movements during 2020-2021 period when compared to 2019-2020 period. Cochin port and Marmugao port should concern on cruise shipping because Cochin and Goa is world famous tourist place these both port should attract tourist vessel. There are several countries which do not have cargo but they are attracting the tourist vessel. And India has so many world famous tourist places.

5.3. CONCLUSION

In the above study on major port performance with special reference to west coast of India, I covered different dimensions. First chapter on study talks about introduction of ports and shipping industry, it gives a brief idea about present scenario of port and shipping industry. Chapter 2 talks about literature review about port industry of India. Chapter 3 consist the profile of all major port located at west coast of India. Chapter 4th is all about the statics of major ports with special reference to west coast of India. Chapter 4 has all the previous year statically performance of all major ports of India.

The conclusion after doing all the study is that, I come to know Indian west Deendayal port and JNPA port is performing extremely well. Deendayal port handling more traffic than others. There is a lot of scope to expend the shipping business in west coast of India, because only Deendayal port and JNPA port is performing well, rest of the ports on west coast are performing on an average and New Mangalore port and Cochin port showing slight decrease in overall cargo movements in 2020-2021 periods. Mumbai port have high capacity utilisation percentage in the west coast ports. The negative side of Deenadayal port is high turn around time.JNPA have less turnaround time when compare to other west coast ports.

BIBLIOGRAPHY

WEBSITES:

- http://shipmin.gov.in/
- http://www.ipa.nic.in/
- http://mumbaiport.gov.in/
- https://www.deendayalport.gov.in/default.aspx
- http://www.jnport.gov.in/
- http://newmangaloreport.gov.in:8080/#!/
- http://www.mptgoa.com/
- https://data.gov.in/dataset-group-name/port-statistics
- http://tariffauthority.gov.in/UserView/index?mid=1329
- https://www.ibef.org/industry/ports-india-shipping.aspx

JOURNALS AND REPORTS:

- Rittiwika Tamuli,"NMDP-Catalyst for Growth" Indian Infrastructure, Vol.lX, No.5, December 2006, pp. 68 – 71
- Subramaian. S and Dr. Illangovan. D, "Challenges of Cargo Container Services in Major Ports in India", Indian Journal of Marketing Vol. XXXVII, No.l2, December 2007, pp.43 – 47
- Nagendra V. Chowdary (2007), "Sea Ports in India: An Overview, Hard Infrastructure - The New Imperatives and Reforms, Economic Series, ICFAI Books Hydrabad, 2007.

- Kunal Bose (2007), Port Privatisation: Unlocking Value, Hard infrastructure- The New Imperatives and Reforms, Economic Series, ICFAI Books, Hydrabad 2007.
- Khanna. K.K and Dr.Gupta.V.K, Economic Geography of India, New Delhi, Sultan Chand and Sons-2005. pp. 434-443
- Pradeepta Kumar Samanta, Private Sector Participation in Transport Infrastructure Development: A Study of the Port Sector, the ICFAI Journal of Infrastructure, December-2005, Vollll, No: 4, pp. 13-25
- Anand .A - The Sethusamudram Ship Canal Project - Empowering the Port Sector, The ICFAI Journal of Infrastructure, December-2005, Vol III, No:4,. pp 29-34

GLOSSARY

1. Mooring: A mooring is any permanent structure to which a vessel may be secured. Examples include quays, wharfs, jetties, piers, anchor buoys, and mooring buoys
2. Tonnage: Tonnage is a measure of the cargo-carrying capacity of a ship.
3. Berthing: Berthing means bringing a vessel to her berth until the ship is made fast
4. Turnaround time: In ocean shipping, the time that is taken between the arrival of a vessel and its departure is referred to as the turnaround time. The vessel turnaround time is used to measure efficiency of port operations.