

Port Infrastructure Development in India

Mr. Varunkumar J. Parekh¹ Mr. Vivek D. Patel² Mr. Rushabh A. Shah³

^{1,2}Student of final year M.E (Construction management) ³Assistant Professor

^{1,2,3}Department of Civil Engineering

^{1,2,3}S.N.P.I.T. & R.C

Abstract— This research work has been aimed to carry out the current infrastructure of Gujarat private and government ports. This report seeks to empirically analysis port infrastructure changes in Gujarat state with three cargo belts of Gujarat and dedicated freight Corridor Corporation of India limited from JNPT Maharashtra to DANKUNI West Bengal. The result of our project represents the total infrastructure changes indicate the pricing of sea port infrastructure is the primary cost base, but other factors also relevant to port pricing models and servicing models are actually used by poets. Among those factors, in particular, demand and port management and governance model have been found to significantly impact port infrastructure changes. Given the explanatory nature of this investigation also discuss the limitation and implication for port authorities, ministry of shipping, and ministry of affairs, custom department, central government, private companies, policy maker and future research. We can involve if our government and ministry of shipping involves the rules and regulation for the effective operation of ports, and if we provided facilities like world biggest and best port like Shanghai port at china; Port of Roffordam at Netherland; and port of Singapore at Singapore like remote access GPS operated vehicles, supports from huge river, heavy crane load carrying capacity, good facilities with backup yard, pipe line facilities for the liquid and gases material at least up to connected to interstate connection. Our biggest port, Mundra port is not take its place to top 10 ports of world, because we are lacking infrastructure development as compare to international port standards and facilities. From the port infrastructure facilities we can manage large number of bulk capacity from the water transportation. From the effective use of port, the GDP growth is increase. Through the port operation it increase the employment and surrounded are facilitated with the basic needs and requirements. With the usage of port, it increases the relationship of two countries with the safety purpose and business business.

Key words: Port infrastructure, port connectivity, port technology, Indian ports scenario, and cargo belt of Gujarat, port law in India

I. INTRODUCTION

This rather long but comprehensive definition of a port captures all essential attributes of a seaport. The definition seeks to essentially emphasize that a port provides not just a single service to its customers but a multitude of services involving a wide range of operators. The UNCTAD definition also sets the benchmarks for distinguishing a modern port from many of the conventional ports, which may only provide few of the services and fall short on many others. Quite arguably, ports can be of different kinds offering some of the services but not the whole range. The definition of port also substantially expands the scope of various infrastructure facilities that ports need to maintain to be able to offer services to their different customers.

A. Objectives of Study:

- (1) To study, infrastructure scope of Indian ports.

II. TYPE OF PORTS

In Indian context, the classification of ports in terms of major and minor ports has been largely derived from legal enactments, such as Indian Ports Act 1908 and the Major Ports Trusts Act 1963. However, the words .major. and .minor. which seem to suggest the size of the operations of a port are somewhat misleading considering that not all .minor. ports in the country are really minor either in size or traffic performance, nor all .major. ports are really major performers. For instance, the two Single Buoy Moorings (SBMs) off the port of Sikka in Gujarat alone now handles one third of the total POL traffic handled in the 12 major ports. By same token, the Kolkata port, considered a .major port. has barely handled 5 million tonnes of cargo in 2001-02, while Haldia, considered to be its satellite port handled 25 million tonnes in the same year.

It would however, be more meaningful to arrive at a broad classification of ports based on a composite parameters like location of the port along a major global trade route, the level of cargo volume handled by a port and how the primary cargo hinterland of the port is integrated into the larger national and global market. Leading international maritime economist Martin Stop ford, in his .Maritime Economics. offers a more meaningful and contemporary classification of ports based on the location, cargo volume and nature trade and logistics function served by a port in the national and global economy and has proposed a four-fold Classification. He divides ports into four broad typologies. Local Small Ports. small and of local significance (Type 1), Large Local Ports. large but not involved in global trade (Type 2), Large regional Ports . large port but limited to region (Type 3) and Redistribution or Transshipment Ports . Large ports, wholly dependent on global trade (Type 4)

Type 1: Local Small Ports

Often referred as .tiny, minor, intermediate or captive. ports in the Indian context, there are several hundred such small ports in the world, which primarily cater local cargo requirements, demand for passenger ferrying and fishing operations. Most of these ports are generally only capable of handling lighter age vessels, barges and small crafts, which can easily operate with naturally available draft. While some of the typically small port locations have been selectively developed as large local ports (such as Mundra and Pipavav on the Gujarat coast), a large majority of such small ports remain as small ports serving the local needs. The advantage with such small local ports being the low capital investment, which typically involve minimal marine constructions, that at best could include a jetty or elevated platform for landing small vessels and are mostly dependent on naturally available drafts or high tide. Some of these small ports, could however be developed as .captive jetties. for handling

break-bulk or other bulk commodity such as chemicals or coal, which could be quickly moved to nearby local industry or a power plant.

Type 2: Large Local Port

A large local port is different from a small local port mainly in terms of its higher cargo throughput facilities for bulk or container cargo and enhanced capabilities for handling larger vessels, using dredged channel and berths. While a large local port could thus, have facilities for handling larger vessels, such ports however do not necessarily mean very heavy investments in cargo handling facilities, given the limitations of cargo traffic specific to that port. However, cargo volumes received at such a port grows steadily and consistently, it becomes possible to increase the level of investments in further improving the port infrastructure facilities and some of these large local ports could graduate into a regional port.

Ports like New Mangalore or Mormugao on India's west coast or Paradip and Haldia on the East coast could be termed as such large local ports, catering primarily to their immediate hinterland.

Type 3: Large Regional Ports

A large regional port essentially acts as an aggregation point for cargo from beyond its immediate hinterland. In Indian context, where the land-locked cargo hinterland is fairly vast, the cargo aggregation and re-distribution on a regional basis takes place, in case of ports like Chennai in the Southern region, Mumbai in the Western region or Visakhapatnam in the Eastern region. In an international trade context, a large regional port would thus, basically refer to ports that serve an extended region comprising a group of countries. Large regional ports could include ports like Salalah, Colombo or Dubai, which consolidate cargo through feeder line operations; especially in container cargo movements for onward mainline shipping movements. These ports also regionally re-distribute cargo received through the mainline vessels using feeder operations to large local ports in the region. These large regional ports such as Colombo, Dubai and Salalah etc. also act as nodal points in the international trade routes.

Type 4: Transshipment Ports

Some of the leading ports of the world have been developed or operated as purely international transshipment ports with highly specialized infrastructure facilities for handling different types of freight and act as switching points for cargo to be carried by deep-sea vessels operating on trans-continental trade routes. The ratio of transit cargo handled by these transshipment ports is very high, compared to locally bound cargo. Ports like Singapore, Hong Kong, Rotterdam, or Port Klang, among leading transshipment ports in the world, are operated with state-of-the-art infrastructure facilities and are capable of handling largest of post-anamax vessels and high cargo throughput levels. These ports essentially act as cargo processing centres in the global maritime logistics chain. Due to large turnover of ships and cargo handled at these ports, they also offer highly competitive rates, designed to attract large liner companies. Based on the above classification, some of the key existing ports involved in Indian cargo trade both in India and overseas can be grouped as under:

Type One	Type Two	Type Three	Type Four
----------	----------	------------	-----------

Small local ports	Large local ports	Large regional ports	Transshipment ports
Porbandar	Mormugao	Chennai	Singapore
Machalipatnam	New mangalore	Mumbai	Hongkoong
Dharamtar	Tuticorin	Visakhapatnam	Rotterdam
karwar	Paradip	kandala	Mundra (proposed)

Table 1: types of ports

A. Factors Influencing Type of Port:

Most port locations, including some of the leading ports in the world has evolved over a long historical period of development of global trade and the national economy.

However, it is observed that ports that have been closely connected with international trade and commerce have seen the maximum development. Many a changes in the composition and structure of global trade, especially as reflected in the dramatic growth of container cargo trade, has in particular brought about many unprecedented changes in the port development strategy pursued by port authorities in some countries. Some of the major international ports like Hong Kong, Singapore, Salalah, Tanjung Pelepas and India's own Nhava Sheva port have come up mainly surf-riding on the growth in container cargo trade in the last 10-15 years. Several key factors are however involved in the development of ports:

Proximity to important world trade routes Ports located at the mouth of important canals such as Suez or Panama Canal or enroute of major sea trade routes such as Trans-Pacific or East-West have led to the development of several transshipment ports such as Colombo, Singapore, Alexandria etc. The volume of trade that takes place along the trade route or the canal no less drives the traffic volumes handled by these ports.

Growth of National Cargo Trade Volumes The growth of port sector in some of the countries like

China and India is mainly led by growth in the national trade in terms of exports and imports. This is particularly significant in case of those ports that are not driven by international cargo transshipment volumes. The level of integration between the national and global economies also to a large extent determine how far the port sector can benefit through growing volumes of a country's trade growth, such as witnessed at Shanghai port.

Port and the Cargo Hinterland A strong and vast cargo hinterland, which generates large volumes of export and import cargo for the port, forms its real backbone of support. The economies of scale that get generated in terms of cargo traffic volumes go a long way in resizing the port infrastructure to match the expected growth in traffic volumes. Coupled with strong inland connectivity between the port and its hinterland, the competitive position of the port is further strengthened.

Regional Inter-Port Competition Though prevalence of natural public monopoly in the port sector in most countries

has all along prevented any strong competitive forces from coming into being, the scenario is rapidly changing in terms of both regional competition among ports for the transshipment cargo as also between new and old ports within the national port sector such as India.

B. Port Infrastructure Layers:

The port infrastructure encapsulates a complex aggregation of physical assets and cargo-handling facilities coupled with navigational aids, vessel traffic management, berthing of incoming vessels that call on ports. The port infrastructure basically enables port management to deliver wide range of services and act as an effective interface between sea and surface modes of transport. With bulk of the global trade volumes transported by liner vessels of various types, the level of service efficiency in handling of such vessels and the costs of port services have begun to have a critical bearing on the competitiveness of a country's global trade. Port service efficiencies are however, most often a direct function of the economies of scale achieved in terms of various port infrastructure facilities and how they are operated, which together determine the operational capabilities of a port. The levels of infrastructure build-up and the type of services that different ports provide vary widely depending on the volume and type of cargo traffic handled. Further from a port investment point of view, the distinctions between various types of infrastructure such as basic port infrastructure and operational port infrastructure, port superstructure and port equipment are important in terms of expected rate of returns, the length of payback period and the size of investment. While most ports are widely different from one another in many respects, they do share certain common infrastructure elements.

C. Marine access infrastructure:

Port Entrance or Channels Port entrance channel is an artificially created navigational path, which provides required water depths for the ships to enter the allocated berth slots in the port area. It is created through dredging of the seabed as per required depth, width and length specifications. Deeper and wider the approach channel in a port enhance the capability of port to handle larger sized and more number of ships, which in turn helps lower the total cargo shipment costs by enabling larger parcel size of shipments. This is true in respect of most commodity freight segments, especially in dry bulk commodities like coal and iron ore, which are more economical to handle in capsize vessels, besides the container cargo, where bulk of the global traffic volume is handled through large cellular ships.

However, barring the case of ports (like Mundra, Kakinada, Gangavaram) which have natural deep draft, which do not require an artificially dredged channel, most ports in India are shallow draft ports, which require the depth of the approach channel to be artificially created and subsequently maintained on a regular basis. However, as global maritime trade is witnessing dramatic increases in ship sizes and the economies of scale in bulk cargo and container cargo movements increasingly favour large sized parcel movements, the ports are under pressure to provide the required facilities to shipping lines or loose their share of cargo traffic to other ports.

In Indian port sector, lack of adequate draft at the port entrance is one of the key strategic development issues

that need to be addressed at a macro planning level for the port sector. The government and the port authority have so far been the key nodal agencies that have invested in the creation of this marine infrastructure at various ports. Dredging an approach channel is a highly capital intensive activity that involves massive amounts of displacement and the cost of dredging is highly sensitive to the type of seabed to be dredged. While dredging of loose sand beds is relatively cheaper dredging of hard rock beds could be highly costly and involves expensive equipment and technology for blasting. As the profile of vessels calling on various ports widely differs, the design specifications for approach channels need to be planned meticulously factoring in the expected returns on investment in terms of likely growth of port traffic and expected earnings from port operations.

III. CONCLUSION

Sr No.	Ideal Port Infrastructure Facility	Studied Port Infrastructure Facility
1	Gps Communication	Ordinary Communication
2	Gps Advanced Cranes	Ordinary Cranes
3	Good Connectivity Of Road And Railways	Having Four Lane Road (Under Construction) And Having 74 Kms Of Private Adani Rail.
4	Healthy Capacity Of Goods For The Business	Low Capacity As Compare To Foreign Ports
5	Heavy Capacity Of Terminal To Loading And Unloading The Goods And Logistics	Comparitively Low Capcity To Loading And Unloading The Goods And Logistics
6	Involment Of Private Sector For Ports	Involment Of Government And Private Sector For Ports
7	Gps Oprated Vehicles For The Operation Of Loading And Unloading Of Goods And Logistics	Vehicles Are Not Operatd By Gps But Operated By Manually Scheduled For The Operation Purpose.
8	X-Ray And Highly Infrarated Technology And Machinery For The Inspection Of The Goods And Product	Only X-Ray Machinaries Are Used For The Inspection Purpose

9	Use Some Supports Also From Wide River	Still Not Useage And Support From Any River
10	Having Heavy Load Carring Capacity Of Cranes	Comaparitively Having Low Load Carring Capacity Of Cranes
11	Pipeline Facility For The Oil Transpotation From One Country To Another Country	Such Facility Not Available
12	Advanced Dragging For Smooth Transpotation Of Ships	Small Dragging Done Yet At Biggest Port Of India, Port Of Mundra.

REFERENCES

- [1] www.kandlaport.gov.in
- [2] www.thfrc.gov
- [3] www.rnbgujarat.org
- [4] www.portofmundra.com
- [5] www.pipavavrailway.com
- [6] www.infrastructure.gov.in
- [7] www.pipavav.com
- [8] www.kutchrail.org
- [9] www.cewacor.nic.in
- [10] www.gmbports.org
- [11] www.ic.gujarat.gov.in
- [12] www.customsgujarat.nic.in
- [13] www.concorindia.com
- [14] www.gidb.org
- [15] www.indianrailways.gov.in
- [16] www.jbic.go.jp
- [17] www.mapsofindia.com
- [18] www.ipa.nic.in
- [19] www.india.gov.in
- [20] www.nhai.org
- [21] Indian Infrastructure – August 2007 “Key Developments”, Pg. 36
- [22] Presentation on “Port Led Development in Gujarat” by Shri H K Dash, IAS, CEO - GMB
- [23] Report of the Committee of Secretaries – Road Rail Connectivity of Major Ports