4 Port Connectivity

4.1 Cargo Dispersal at Ports

A multimodal system, which uses the most efficient modes of transport from origin to destination, is a prerequisite for the smooth functioning of any port. With the growth of cargo in the ports by over seven *per cent* and increase in container traffic by 17 *per cent*, the Government had laid emphasis on capacity expansion and improvement in infrastructure of the ports for handling these growing volumes of cargo. Unless matched with connectivity infrastructure, the increased cargo would result in congestion and undermine the competitiveness of Indian industry and also affect the economy at large.

Unlike international ports like Singapore and Rotterdam, the shortage of storage space in the major ports in India had further compounded the problem of speedy evacuation of cargo from port premises. The Port of Rotterdam Authority[68], in the consolidated business plan for major ports, highlighted weaknesses such as poor hinterland connections, inadequate road and rail facilities, sub-optimal usage of rail connectivity, increasing pressure on existing facilities and lack of inter-modal facilities.

In the major ports, liquid cargo was directly moved to the storage tanks of the users, bulk cargo was moved initially to the stackyards within the ports and from there to the users' points. Containers were initially stored in container yards within the port or moved to Container Freight Stations (CFS)[69] and from there to the users' points. In a few cases, containers directly moved from the ship-shore interfaces[70] to the user areas.

[68] As stated earlier, the Port of Rotterdam Authority acted as consultant to IPA in consolidating the individual business plans of all major ports.
[69] Closed areas for containers, having customs clearance facilities as well
[70] The point where the cargo is first unloaded from the ship

It was noticed that in the major ports, roads continued to be the dominant mode[71] for dispersal of cargo as shown in Fig 4.1.

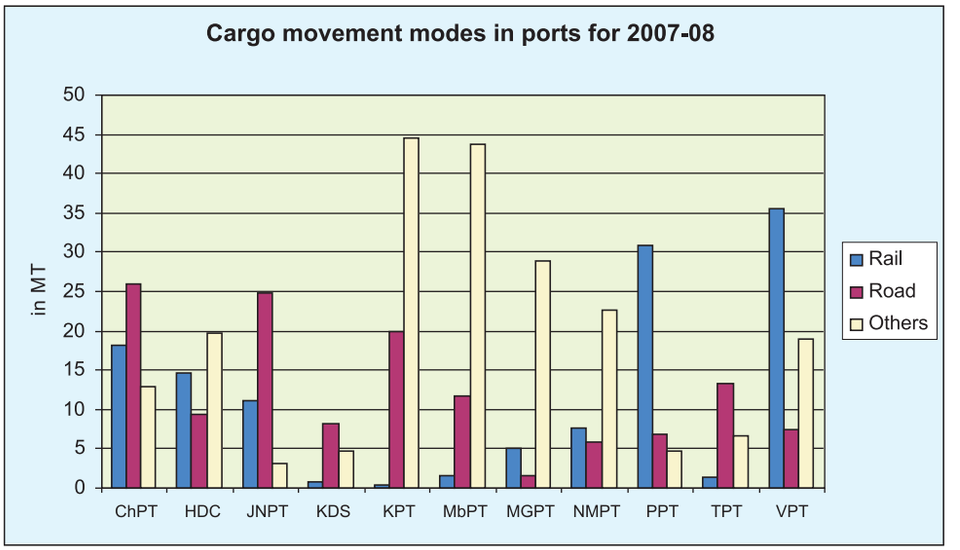

Fig 4.1

The other forms of dispersal mainly comprised movement of liquid cargo through pipelines and also included inland water barges at Mormugao port[72] and conveyor systems[73] at Tuticorin. The percentage of different modes of dispersal of cargo in major ports is shown in Fig 4.2. The other modes of disposal mainly comprised pipelines for movement of liquid cargo.

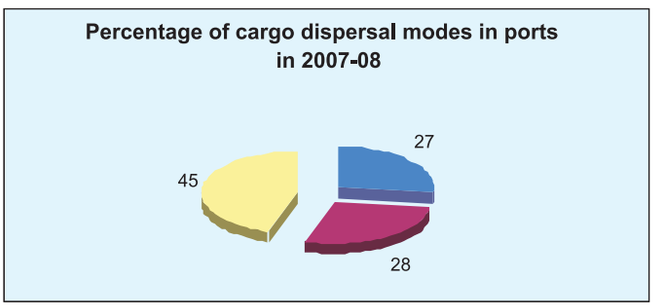

Fig 4.2

At the Port of Rotterdam, 50-60 *per cent* of the movement of bulk cargo and containers is done by barges because of excellent inland water networking. Inter-modal connectivity by rail and road is seamless. The modal share of inland water transport is 42 *per cent* in Netherlands, 15 *per cent* in France, 15 *per cent* in Hungary, 15 *per cent* in USA, 14 *per cent* in Germany and 13 *per cent* in Belgium. Although India has 14,500 km of navigable waterways, of which about 5700 km is navigable by mechanized vessels, the modal share of inland water transport in India is only 0.28 *per cent*.

[71] Cochin Port Trust did not disclose the modes of cargo movement in its Administration Report unlike the other ports.

[72] 78 *per cent* of bulk cargo at Mormugao port moved through barges

[73] 28 *per cent* of cargo at Tuticorin moved through conveyor systems

4.2 Dispersal of Cargo through Railways

Keeping in view the significance of port connectivity for efficient evacuation of cargo from the ports and its impact on international trade, the Committee on Infrastructure recommended (2006) minimum double-line rail connectivity for major ports, which was to be achieved within the stipulated time frame of three years.


Single line connectivity at Tuticorin port

Audit, however, observed that JNPT, Kandla, Mumbai, and Paradip ports had double lines in parts of their rail networks whereas the ports at Chennai, Cochin, Goa, Haldia, Kolkata, Tuticorin and Visakhapatnam continued to have single-line connectivity, resulting in slower movement and inefficient cargo dispersal. At Cochin, the rail connectivity from the port area to the main rail line network was in poor state. The marshalling yard at Willington island was being used as an unloading platform for coal cargo. According to the business plan of the port, the line was connected to the main line by an old railway bridge which did not have the capacity for high traffic. At Kandla, there were 11 tracks, of which only three had double lines. Users at Mormugao port felt that double line connectivity was required at the port to harness cargo from nearby areas like Belgaum. At Paradip, the network from the port premises to the railway station was partly double line.

Although NMDP envisaged taking up 16 railway schemes for laying of new lines, no specific scheme for conversion of single lines to double lines had been mooted. Despite the emphasis on exclusive freight corridors by the Government, passenger and freight systems shared the same railway networks outside the port areas. Rail networks at ports other than Mormugao were not connected to the hook points and the cargo had to be inter-carted[74] to the sidings using dumpers, trucks and trailers. Such multiple handling of cargo could only add to increase in the handling time and the cost of handling. Port users at Chennai felt that the long distances between railway sidings and the berths needed to be addressed by laying railway tracks just along the berths which would result in quicker, easier and cheaper loading / unloading operations.

[74] transported from the berths to the storage areas or other areas

Handling efficiency at sidings depended on the length of the sidings and the equipment available there. Audit observed that the sidings at JNPT, Haldia, and New Mangalore could handle full rakes of 59 wagons, while only some sidings at Chennai (two sidings), Paradip (21 out of 41) and Visakhapatnam (eight out of 15) could handle full rakes. Out of 18 sidings at Mumbai, only two had the length to accommodate 40 wagons whereas the other sidings could accommodate 20 or less wagons. At other ports, the sidings could not accommodate even half rakes. At Mumbai, even the two sidings having capacity of 40 wagons each could not be optimally utilized as the low capacity locomotives used for hauling could not handle rakes having more than 20 wagons. Users at Kolkata port stated that full rakes could not be handled at the berths at Netaji Dock and Kidderpore Dock due to which longer time was required for handling the rakes, resulting in increased detention charges for wagons. Loading a rake at Mumbai and some sidings of Chennai took upto 13 hours which was higher in comparison to other ports as shown in Table 4.1.The loading and unloading systems at sidings also differed across ports. Haldia, JNPT, Mormugao and Bharati Dock at Chennai had mechanized tippling systems for dry bulk and rail mounted gantry cranes (RMGC) for containers whereas at other ports, the system was not mechanized.

Port	Rakes per day (2006-08)	Average Time to load a rake (hrs)
ChPT	0.5-1.5	6-13
JNPT	16.8	3.72
MbPT	2.5	12.69
NMPT	1	9
PPT	16.6	5
TPT	2	8

Table 4.1

Audit observed that in JNPT, Mormugao and Visakhapatnam, the handling at private sidings was more efficient as compared to the port sidings. As an example, the handling at the sidings of private operators and the port sidings at JNPT is shown in Table 4.2 below:

Terminals of JNPT	Rakes per day	Number of RMGC	Average time per rake (no of hours)
JNPCT[75]	5.22	5	4.41
NSICT[76]	6.04	3	3.65
GTICT[77]	5.60	3	3.10

Table 4.2

The time taken for handling a single rake at the private sidings of M/s SWPL[78] in Mormugao port was five to six hours as compared to the port operated berths, where handling a single rake

75 Jawarharlal Nehru Port Container Terminal
76 Nhava Sheva International Container Terminal
77 Gateways Terminal India Container Terminal
78 South West Port Ltd

took an average of 13 hours. In its reply, the Mormugao port Management stated (June 2009), that the differences in handling time were due to the fact that unlike the private siding, the port operated sidings did not have mechanised handling infrastructure. At Cochin, the sidings of the Food Corporation of India (FCI) and the Indian Oil Corporation (IOC) had not been used for more than five years.

4.3 Adequacy of Rakes

For the operation of sidings, working agreements existed between the Railways and siding operators in seven[79] ports. However, in the cases of Cochin, Kandla, New Mangalore and Tuticorin ports, parties had to directly deal with the Railways for placing indents for wagons. At Cochin, two terminal operators, viz FCI[80] and IOC[81] had their own rakes whereas at JNPT, the supply of rakes was controlled by the Container Corporation of India (CONCOR). At Cochin port, CONCOR operated only 70 trains during the year which at full capacity could handle only 6300 20-foot containers, which was less than three *per cent* of the total container movements through the port.

Adequate and timely supply of rakes was necessary to reduce the waiting time for movement of cargo. Audit observed that there was a short supply of 90 rakes at Visakhapatnam Port Trust in 2007, due to which the port could not meet the commitments of handling the required tonnage. The port Management stated (May 2009) that the Railways were being pursued for supply of rakes. At Mumbai port, only 47 *per cent* of the wagons requisitioned in July and December 2007 could be supplied by the Railways. The trend of non-supply of wagons registered an increasing level there as shown in Fig 4.3. Users also felt that the free time for removal of cargo was insufficient considering the shortage in availability of rakes.

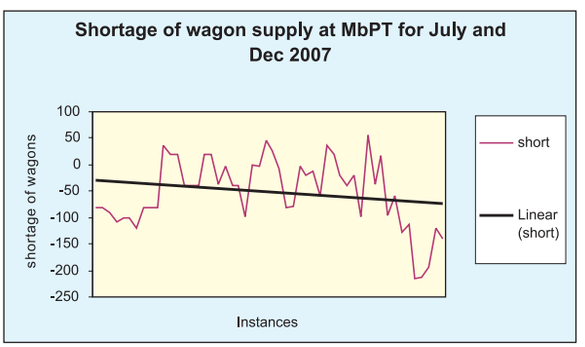

Fig 4.3

The wagons indented by the ports are supplied by the Railways to the ports and then to the parties for a length of time (free time), beyond which demurrage charges are payable.

It was observed at JNPT that 16.72 *per cent* and 9.94 *per cent* of the cargo could not be cleared within the free time during the months of July 2007 and December 2007 respectively. This was

[79] Chennai, Kandla, Kolkata, Mormugao, Mumbai, Paradip and Visakhapatnam,
[80] Food Corporation of India
[81] Indian Oil Corporation

due to delays in obtaining delivery orders, inadequate transport arrangements by Container Freight Stations and also non- supply of rakes by CONCOR. It was also noticed that due to non-dispersal of cargo within the free time, the port recovered Rs.15.31 crore during 2007-08 as storage charges from the parties.

4.4 Limitations of Railway Infrastructure

International railway systems carry more than 100 wagons per rake with the Australian system carrying over 300 wagons per rake. Compared to this, a rake in India handles 58 BOX wagons as the length of the loops in the yards and stations in India is only 686 m, limiting the length of the trains. Even rakes of 58 wagons cannot be handled at sidings of some ports as stated earlier in Para 4.2, with some of the sidings capable of handling only five wagons at a time.

The space envelope[82] in India does not permit the movement of double stack container wagons. Since stations, platforms, roofs and bridges had been constructed according to the previously designed space envelopes, the envelopes of existing railway lines cannot be increased, thereby limiting the carrying capacity of the rakes. Load carrying capacity expressed as the ratio of a loaded wagon to an empty one ranges from 4-7 internationally as against 2.5 in India.

The axle load permitted on tracks in India was 20.3 to 22.9 tonnes as against 25 to 37.5 tonnes per axle carried by major freight carrying systems in the world such as the Australian system.

These infrastructure constraints limited the payload carrying capacity of freight trains.

The high density Eastern and Western rail corridors in India were saturated in terms of line capacity and utilisation. To overcome some of these issues, the Committee on Infrastructure approved (February 2006) the constitution of a Task Force to prepare a concept paper on dedicated freight corridor projects. The report suggested an institutional roadmap for the construction and operation of the dedicated freight corridors. These corridors would be constructed, operated and maintained by a corporate entity on commercial principles, relying on efficient technological solutions. Scarce budgetary resources would be leveraged for raising debt from the markets based on a sound business plan.

Audit observed that even after the lapse of three years, the projects had not been implemented as of date due to financing issues as a result of which, the benefits from these exclusive corridors could not be harnessed by the ports.

[82] The vertical cross- sectional area at any point on a railway line

4.5 Development of Port Railways

NMDP envisaged undertaking 11 projects under Phase-I and three projects under Phase-II for improvement of port railways. The scheduled date of completion of the projects under Phase-I was March 2009, whereas the projects under Phase-II were to be completed by 2012.

Audit observed that out of 11 projects under Phase-I, only one project had been completed as of date as shown in the ***Annexure***. Five projects were languishing at the planning stage, two projects had been taken over by the Railways and four projects were still in progress due to delays at various levels. The progress of three works under Phase-II was very slow.

Audit also observed the following deficiencies:

- At Cochin port, 70.29 acres of land in the port area was under the possession of the Railways since 1949. Due to this, CoPT could not undertake rail development projects on its own nor levy way leave charges[83] unlike other ports.
- Mormugao port was connected to the trunk Railways (South Western Railway and Konkan Railway) by a single line which was also used as a passenger line. This hampered the timely movement of rakes out of the port. There was no immediate scheme for conversion of the single line to double line tracks. The port, in its reply, stated (June 2009) that lack of proper rail connectivity was assuming great importance. Better connectivity was necessary for the port to achieve the handling target (45 MT) set by the Ministry for 2009-10.
- Mumbai port had deposited (2004) Rs. 89 lakh with Central Railway for the preparation of estimates and survey reports for a dedicated goods line from Wadala to Kurla. The MoU of the work was, however, signed with the Railway only in January 2009, after the expiry of five years. This resulted in blockage of Rs 89 lakh, besides denial of the intended benefits of the connectivity to port users.
- At New Mangalore port, the users stated (December 2008) that a rail link between Ankola and Hubli should be established to reduce the distance from the port to the mineral rich hinterland.

[83] Charges levied for the use of port land

4.6 Absence of Exclusive Roads and Access Restrictions on Common Roads

It was noticed that 28 *per cent* of cargo dealt with by the major ports during 2007-08 was transported through roads. Except for Haldia, Mormugao, Paradip and Visakhapatnam where rail was the preferred mode for dispersal of cargo, the movement at other ports was by roads.

Exclusive approach roads and unrestricted movement of cargo play a significant role in speedy evacuation of cargo from port areas and reducing congestion to a great extent.

Audit observed that most of the major ports except Princess Dock in Mumbai had two to three common entry and exit gates for movement of cargo. JNPT had only one access point to the port. In all the ports, the exit points opened to roads common to general traffic as well and there were no exclusive port roads except for short ones in Kandla and Visakhapatnam. This restricted the free and speedy movement of cargo from the port premises, which was further delayed due to restrictions imposed on cargo movement during working hours. At Chennai, the movement of cargo during the daytime was restricted due to the absence of exclusive approach roads. At Mormugao port, entry for heavy vehicles in the city was restricted during daytime. At Kolkata port, Customs clearances were given from 10 am to 4 pm whereas from 6 am to 6 pm, trucks were not allowed on the roads. The waiting period for trucks to enter the port was thus very long. Due to non-availability of data, the waiting time could not be measured in respect of Kolkata port but the feedback of users disclosed that it was more than a day.

Thus the lack of exclusive approach roads as well as access restrictions on common roads resulted not only in delays in the movement of cargo but also led to congestion.

At Visakhapatnam, users felt that due to several railway crossings, the movement of trucks on roads had to be stopped frequently due to placing of wagons. The port's Management stated (June 2009) that the interface between rail and road was an issue of concern and congestion was caused mainly due to lack of space. Construction of flyovers at some points was being contemplated by them.

Users of Mormugao port felt that restrictions on city roads for trailers carrying 40 feet containers caused loss of time.

4.7 Wider and Better Maintained Roads

The Committee on Infrastructure recommended that all port connectivity national highways having a traffic count of 12,000 passenger car units or more should be taken up for four-laning and directed the port trusts to prepare pre-feasibility studies for such projects. Audit observed that

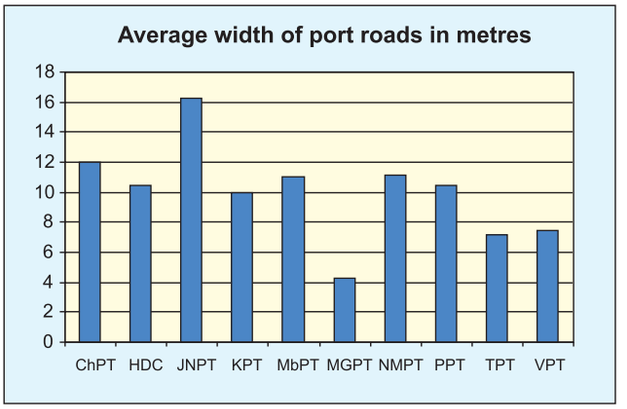

Fig 4.4

the average width of roads varied amongst the ports. As seen from Fig 4.4, the roads at Mormugao Tuticorin and Visakhapatnam were narrow. Six - lane roads were available only at JNPT where the maximum width of the road was 22 m.

In Cochin, a sizeable portion of cargo was transported by roads, which were very congested during peak hours. The port roads were not straight and there were no four-lane roads. The existing link road between Wellingdon Island and the NH- 47 bypass was very congested due to heavy truck and passenger traffic during peak hours. The port users suggested an exclusive/dedicated corridor for port cargo. The port reported that the land available in the port area to provide for a four lane road was very limited. Cochin port had requested NHAI in May 2007 to update the detailed project report pertaining to the four-laning of NH- 47A from Kundannoor to Willingdon Island through their consultant, the outcome of which was still awaited.

Ports such as Haldia, Kandla, Mormugao and Visakhapatnam, were connected to one national highway whereas the other ports had connectivity with more than one highway.

At Chennai, port users felt that the national highways leading to the city from various parts of the State were in good shape, but the city roads connecting such national highways with the port were in poor condition. For example, the road connecting the port with the National Highway leading to Kolkata was just 15 feet wide for a long stretch at Royapuram leading to frequent traffic congestion. At Cochin, the users felt that the port roads were narrow involving numerous turns with residential areas, schools and religious buildings at both the sides, hindering movement of traffic.

New Mangalore port users expressed the need for widening of NH -13 connecting the mineral rich hinterland and the port.

Port users at Visakhapatnam found the condition of the port roads to be very poor. The roads in the dock area being laid with cement bricks were getting damaged within a short period of six months, requiring frequent repairs adding to the traffic problem. Besides, there were no alternate roads for emergency use. The port's Management stated (June 2009) that cement bricks were being used after being considered suitable in light of the marshy soils beneath and also to avoid the huge costs of consolidating the road crest to the extent of 10 metres as recommended by a consultant.

4.8 Delays in Road Connectivity Projects

The National Maritime Development Programme envisaged 22 road connectivity projects under Phase-I and five projects under Phase-II. The projects under Phase-I were to be completed by March 2009 whereas the stipulated date of completion of the projects under Phase –II was 2012.

Audit observed that only two projects had been completed as of date and 15 projects were in progress. It was noticed that two projects were at the planning stage, whereas the feasibility studies of three projects had been proposed to be taken up. Two projects at Visakhapatnam were at the stage of feasibility study and one project each at Chennai and New Mangalore ports had been taken over by NHAI as Special Purpose Vehicle projects. Audit observed that the delays in completion of these projects were due to lack of environmental clearances, alignment issues and changes in the scope of some works.

In Chennai, inordinate delays were noticed in the implementation of road connectivity improvement schemes. A connectivity scheme called 'Dedicated Elevated Corridor on NH-4 from Port to Maduravoyal' envisaged as early as in 2005 was still to take off. The port's Management agreed that the road projects had been delayed and stated (May 2009), that they were under execution by SPVs which had been set up for the purpose.

For increasing road connectivity, Mormugao port initiated (2000) construction of a four -lane highway of 18 km under NHAI providing connecting to NH- 17, which was to be completed in March 2003. Despite having deposited funds with the State Government for the project, the highway had not been connected to the port due to delay in land acquisition by the State Government.

Case Study: Road Connectivity projects remained incomplete at Mumbai

- The concretisation of the Mazagaon Sewree Reclamation Road was proposed in July 2006 with a stipulation to complete it by August 2008. Despite the fact that the poor condition of the road hampered the smooth flow of traffic, the work was finally awarded only in June 2007 and remained incomplete as of January 2009.
- The reconstruction work of Nawab Tank Overbridge was pending for more than three years after it was initially proposed in November 2005. Approval of the Board to engage a consultant for preparing the design and estimate took two years after the initial proposal. Although the consultant submitted his report in June 2008, the work had not been awarded as of January 2009..

- Although proposals for construction of two other roads were made in November 2005 for meeting the increased traffic due to the Offshore Container Terminal, the projects were still to be finalized as of January 2009.

- The construction of a salt pan link road between MbPT's Wadala Mahul Pipeline Road and MCGM's Wadala Truck Terminus Road was taken up in 1994 to improve the road corridor for smooth movement of container traffic. It comprised widening of the Wadala Mahul Road (400m), construction of a bridge across Kharoop Creek and construction of a new salt pan link road (700m). While the first two components were completed at a total cost of Rs.2.50 crore in 1998, construction of the link road measuring 700 m was yet to commence due to a litigation arising from the notification for closure of salt work in 1962. As the work was taken up without clear title to land, the objective of easing traffic movement could not be served. Besides, funds amounting to Rs.2.50 crore remained blocked from 1998.

- Mumbai port decided (February 2005) to fund the work of Panjorapole Link road to the extent of Rs.35 crore or 25 *per cent* of the contract amount, whichever was lower. The work order was issued by MMRDA in April 2005 with a completion period of 24 months (April 2007). Till December 2008, only three *per cent* of the work was completed. Moreover, if the road of 700 m length between Wadala Mahul Pipeline Road and MCGM Truck Terminal as referred to in the previous paragraph, was not developed, the purpose of the link road would be defeated.

The Ministry stated (August 2009) that the projects under implementation were being monitored by the Ministry. However as stated in the foregoing paragraphs, it was noticed that the implementation of the projects was badly delayed, due to which the intended benefits could not be availed of in time.

Recommendations

- *Four-laned roads and double line rail connectivity as recommended by the Committee on Infrastructure should be taken up for speedy implementation. Increased length of loops at sidings and larger space envelopes should be factored in while implementing new rail projects so as to harness increased volumes of cargo.*

- *Mechanization of handling at sidings should be considered at ports with larger volumes of bulk cargo.*
- *Emphasis should be laid on the widening of the port roads where port roads are narrow.*
- *Implementation of road projects in close coordination with NHAI should be taken up expeditiously for efficient evacuation of cargo from ports.*