Performance Audit of the

Functioning of Major Port Trusts in India

Ministry of Shipping

Report of the
Comptroller and Auditor General of India
for the year ended March 2009

Union Government (Civil)
Autonomous Bodies
No. 3 of 2009-10
(Performance Audit)

CONTENTS

PREFACE

This report of the Comptroller and Auditor General of India for the year ended March 2009, containing the results of the performance audit of the "Functioning of Major Port Trusts in India", has been prepared for submission to the President of India under Article 151 of the Constitution.

The performance audit was conducted during October 2008 to January 2009 through document analysis, collection and analysis of operational data and concerns of the users, as well as physical inspection of the facilities of the ports. The report is based upon test-check of the records of 11 major port trusts in India for the period 2004 to 2009.

The results of audit of all the 11 major port trusts were taken into account for arriving at the audit conclusions. While framing audit conclusions and recommendations, best practices regarding operational efficiency in respect of ports were also considered.

EXECUTIVE SUMMARY

There are 11 major ports in India governed by the Major Port Trusts Act, 1963, 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. However, with the rapid increase in cargo traffic over the last decade, massive investments in capacity augmentation had become necessary. To address the need, the Ministry formulated the National Maritime Development Programme in 2005-06, which envisaged an investment of Rs 55800 crore for the major ports by 2012. The programme also indicated a paradigm shift in policy towards the 'landlord' model, whereby the ports would act as trade facilitators by investing in common user facilities like deepening of channels, improvements in connectivity, etc, leaving commercial services to private entities under revenue sharing arrangements.

The performance audit revealed that the depths available at the major ports were unable to cater to all types of vessels that plied international waters. Moreover, dredging undertaken by these ports had not been effective as significant variations were noticed between the drafts at the access channels and the berths. The depths reported by the ports did not provide adequate assurance to the visiting vessels. The dredging policy of the Ministry compelled some ports to engage the Dredging Corporation of India for the work, but it often failed to maintain the required drafts. Further, deepening projects, critical for the competitiveness of the ports, were neglected. These factors limited the berthing options available to ships, resulting in their queuing up for a few berths, leading to high pre-berthing detentions. It was estimated that maritime trade in India lost more than Rs 1400 crore per annum on account of such detentions. It was also found that important marine services like providing of tugs and pilots for safe navigability, in which ports enjoyed a monopoly, were not being carried out efficiently. Lack of provision of night navigation facilities also restricted round -the -clock access of vessels to the ports.

It was found that the cargo handling services of the ports were inefficient, as a predominant number of berths still did not have the dedicated facilities that were necessary for quick handling of the main forms of cargo like liquid bulk, dry bulk and containers. Liquid bulk which primarily consisted of petroleum, oil and lubricants, constituting 33 *per cent* of the total cargo, faced handling inefficiencies due to slow rates of discharge at specialized berths, leading to high turn-round time of vessels. The users at the major liquid bulk handling ports were, therefore, compelled to shift handling points to offshore Single Buoy Moorings, thereby affecting the revenues of the ports. It was found that dry bulk cargo, viz. coal, iron ore, fertilizers, etc, comprising around 40 *per cent* of the total cargo, was mostly handled at non-mechanised berths as only eight *per cent* of all the dry bulk berths at the ports had specialized equipment for the same. Moreover, 55 *per cent* of equipment available at all ports except at the Jawaharlal Nehru Port had crossed their economic

lives, resulting in low utilization, with users preferring to hire modern and privately owned equipment. For faster handling, the users of the ports were hiring private labour at additional costs, over and above the mandatory engagement of port labour. It was also found that the ports were assessing labour productivity on the basis of outdated norms. Further, the entire handling output was being attributed to port labour, disregarding the engagement of private labour, leading to misreporting of labour productivity to the Ministry. Thus, the inefficient rendering of marine and cargo handling services made the ports less attractive to trans-shipment cargo and bigger vessels, as compared to neighbouring ports of Colombo and Singapore.

In the case of containers, which saw the fastest growth in traffic during the period covered, around 65 *per cent* were being handled at privately operated terminals in Chennai, Jawaharlal Nehru Port and Tuticorin. The handling efficiency in these terminals touched international benchmarks.

The performance audit revealed that storage space and connectivity at the ports, necessary for smooth accumulation and dispersal of cargo, was inadequate. Dispersal of cargo by rail was affected due to lack of double- line connectivity, low mechanisation at sidings, restrictions in lengths of sidings causing part-rake handling and the absence of exclusive freight corridors. Efficient dispersal of cargo by road was hindered by narrow last-mile linkages, city traffic restrictions on movement of trucks during daytime and lack of exclusive port roads connecting to highways. To address these problems, a number of schemes had been planned and the Committee on Infrastructure had recommended four-laning of roads and doubling of railway lines at ports by 2008. However, due to delays in implementation, only four out of 33 schemes could be completed by March 2009. The possibility of alternative modes like inland water transport and coastal shipping that were being used extensively at international ports worldwide, remained underexplored.

Procedures for assessment, monitoring and reporting of performance by ports were fraught with several deficiencies. The assessment of berth occupancy, a prime indicator for congestion at ports, was distorted. As occupancy was shown in terms of days, a berth occupied for even an hour was being shown to have been occupied for a whole day. Thus, high occupancy was being reported for relatively idle berths. The calculation of handling capacities at berths did not represent the optimum handling possible, based on equipment support, size of vessels, nature of cargo etc., but was based on the actual handling done in previous years. Existing inefficiencies were, therefore, factored into the calculation, resulting in understatement of the capacities of the ports. It was also noticed that critical performance parameters such as pre-berthing detention and turn-round time were not being recorded and reported correctly by most of the ports, leading to the risk of real problems remaining unidentified and unaddressed. Moreover, the targets set by the Ministry through Memoranda of Understanding with the ports, remained mere upgrades of their previous years' performances and were neither based on any norms nor were always mutually consistent. Abnormally low targets like idle time of 42 *per cent* in Haldia and less than 20 *per cent* equipment utilisation at Mumbai did not incentivise efficiency.

Audit observed that only 31 out of 170 schemes planned for the first phase of National Maritime Development Programme (March 2009) could be completed at the 11 major ports, resulting in an investment lag of 80 *per cent*. Implementation of critical deepening and connectivity projects, which was the primary responsibility of the ports under the 'landlord' model, was poor. Private participation in commercial operations at ports, as envisaged under the model, was slow due to delays in handing over of sites and grant of security clearances. An analysis by Audit showed that 18 out of 26 ongoing schemes were delayed by over a year due to delays in approvals at various stages. Build Operate Transfer agreements for the terminals included clauses containing ambiguities regarding the nature of the services to be provided to the ports.

Thus, in order to enhance maritime trade and competitiveness of the ports with the international ports and the emerging private ports in India, the Ministry needs to ensure formulation of adequate draft plans, assessment of dredging requirements based on long-term planning, adequate night navigation facilities, rapid mechanization of handling facilities, phasing out of outdated equipment, proper and effective implementation of deepening and connectivity projects, correct reporting of berth occupancy as well as pre-berthing detention and turn-round time and strict adherence to the defined common minimum standards of performance.

HIGHLIGHTS AND SUMMARY OF RECOMMENDATIONS

Marine Operations

- Lack of navigable depth was the biggest challenge faced by major ports in India as reported drafts did not provide adequate assurance to visiting vessels. As the issue was not addressed adequately, large ships of higher than 60000 dead weight tonnage were not visiting to these ports except for Chennai, New Mangalore and Visakhapatnam. Twenty one *per cent* of the vessels visiting Haldia needed to be lightened to gain access to its berths.

(Paragraph 2.1.1 and 2.1.2)

- Due to significant mismatches in drafts at channels and berths at some of the ports, the shipping lines were left with limited berthing options besides underutilization of draft at approach channels.

(Paragraph 2.1.3)

- Depth survey procedures at the ports were not standardised and in some cases, survey results were not included in the dredging contracts. As per dredging policy of the Ministry, some ports were compelled to engage the Dredging Corporation of India, which often failed to maintain the required drafts. Dredging by port dredgers was costly due to poor utilisation and hiring of private dredgers was justified on faulty basis.

(Paragraph 2.2.1 and 2.2.2)

- Capital dredging projects at Haldia and Kolkata were neglected and poor management of maintenance dredging threatened navigability at these ports.

(Paragraph 2.2.3)

- Barring Visakhapatnam, significant delays were noticed in providing pilotage to incoming vessels in most of the ports.

(Paragraph 2.3.1)

- Accessibility at night was restricted at Cochin, Jawaharlal Nehru Port (JNPT), Kandla, Kolkata, Mumbai and Tuticorin due to lack of adequate facilities for night navigation.

(Paragraph 2.4)

- Maritime trade lost an estimated an amount of Rs 1400 crore per year on account of pre-berthing detentions. These, *inter alia*, were caused due to lack of specialised berths, resulting in congestion of vessels.

(Paragraph 2.6)

Recommendations

- *Concerted efforts should be made by the Ministry to ensure the minimum draft availability of 14 metres as recommended by the Inter-Ministerial Group.*
- *The draft plans of each port, particularly Chennai and Visakhapatnam should focus on addressing the significant mismatches of drafts between the approach channels and the berths.*
- *As the present dredging policy of the Ministry compelled some ports to engage Dredging Corporation of India in spite of the latter failing to meet the targets, a clear cut policy ensuring competitive bidding should be formulated.*
- *Assessment of dredging requirements should be made based on long-term planning and proper surveys with the help of specialized organizations like National Institute of Ocean Technology and Central Water and Power Research and Consultancy Services for better quality assurance.*
- *Proper efforts should be made to improve night navigation facilities in Cochin, Kandla, Kolkata and Tuticorin.*
- *Factors leading to pre-berthing detentions on port account should be identified and addressed by the ports.*

Handling Operations

- Liquid bulk – primarily consisting of petroleum, oil and lubricants (POL) constituting 33 *per cent* of the total cargo in 2008-09, faced handling inefficiencies due to slow rates of discharge through Marine Loading Arms at specialized berths, leading to high turn-round time of vessels.

(Paragraph 1.1, 3.1.1 and 3.1.2)

- At two ports – Haldia and Cochin – insufficient storage capacities and low drafts at liquid berths respectively resulted in diversion of cargo to other ports. Revenues of Cochin port declined as users shifted handling points to the offshore Single Buoy Mooring.

(Paragraph 3.1.2 -3.1.3)

- The method of measurement of the volume of liquid cargo handled and the system of billing varied from port to port. Absence of any standard norm for measurement of liquid bulk resulted in discrepancies between the actual cargo handled and the quantities billed.

(Paragraph 3.1.4)

- Only eight per cent of all berths at the ports had specialized equipment for handling dry bulk, viz coal, iron ore, minerals, fertilizers, foodgrains, etc. A significant proportion was being handled at non-mechanised berths at Chennai, New Mangalore, Paradip, Tuticorin and Visakhapatnam, resulting in higher turn-round times.

(Paragraph 3.2.1)

- Container handling efficiency at JNPT and Tuticorin, particularly at privately operated terminals, fulfilled international benchmarks. Other major container handling ports like Chennai, Cochin and Kolkata registered lower TEUs per berth as these ports were having less equipment support.

(Paragraph 3.3.1)

- At Cochin, 94 *per cent* of the port equipment were beyond their economic lives.

(Paragraph 3.4.1)

- Except for Kandla, the average utilisation of all equipment belonging to nine other ports remained significantly below the minimum utilisation norm of 60 *per cent* as prescribed by the Ministry. This indicated low demand for port-owned equipment.

(Paragraph 3.4.2)

- In all ports except JNPT, 55 *per cent* of all available equipment for handling cargo had crossed their economic lives by 2007-08. At Haldia, where dry bulk made up the biggest cargo share, instead of procuring dry bulk related handling equipment, the port spent Rs 71.19 crore on purchase of container handling equipment that remained underutilized.

(Paragraph 3.4.1 and 3.4.4)

- Assessment of labour productivity at ports was based on outdated norms and was not standardised.

(Paragraph 3.5.2)

- As Handling by port labour was generally inefficient, the Port users at some Ports had to hire private labour at additional cost to overcome handling inefficiencies. The ports, however, attributed the entire handling output to port labour, thereby distorting the reporting of labour productivity to the Ministry.

(Paragraph 3.5.2)

- Availability of open storage sheds was inadequate and of poor quality at Cochin, Kandla, Kolkata and Mumbai. The practice followed at Chennai port of regular review and re-allotment of unutilized licensed storage space was good.

(Paragraph 3.6.1, 3.6.2 and 3.6.3)

- The pollution control cell at Mumbai was inadequately manned; control equipment was not being maintained and air quality was not being adequately monitored there. Visakhapatnam port introduced a number of good practices for containing pollution arising from handling of dry bulk cargo.

(Paragraphs 3.7.2)

Recommendations

- *Ports should address the problem of underutilisation of existing discharge capacities of Marine Loading Arms. To reduce the turn-round time of liquid bulk vessels, low capacity MLAs should be replaced with high capacity arms.*
- *The Ministry should fix a standard system of measurement of liquid cargo and frame a standard document for verification of the quantities handled and claiming of wharfage.*
- *Dry bulk should be handled exclusively at specialised berths with mechanised handling facilities to arrest the increasing turn-round time of dry bulk vessels.*
- *With the increasing trend of containerization of cargo, ports should create facilities of specialised container berths. Possibilities for conversion of existing general cargo berths into such berths should be explored. .*
- *Concerted efforts should be made by the ports to phase out outlived equipment. Selection of equipment should reflect the port's business plan, trend and type of major cargo handled and users' preferences.*

- *For making correct assessments of labour productivity, the ports should revise the manning scales and datum as recommended by the National Tribunal in 2006.*
- *The 11-month ceiling on storage area licences may be modified in the interest of long-term users.*
- *The Chennai model of storage area review may be adopted at other ports.*
- *Ports should consistently deploy oil booms and other protective measures while handling POL cargo to restrict the impact of oil spillage. Oil sensors to detect spillage of oil in the water front and oil-water separators, skimmers, dispersant spray systems etc. should be used to remove pollutants from water bodies as per international best practices.*
- *Ports should make provisions for levying fines on tankers/vessels polluting harbour waters and berths and recover the cost of consumables used for cleaning operations of oil spillages from the users.*

Port connectivity

- In comparison to international ports like Rotterdam, where more than 50 *per cent* of cargo moved by inland barges, the use of inland waterways and coastal shipping was minimal, except at Mormugao.

(Paragraph 4.1)

- Railway infrastructure was found to be deficient at most ports due to lack of double line connectivity, low mechanisation at sidings, restrictions in length of sidings, causing part-rake handling and absence of exclusive freight corridors.

(Paragraph 4.2- 4.4)

- Efficient dispersal of cargo by road was hindered due to narrow last-mile linkages, city traffic restrictions on movement of trucks during daytime and absence of exclusive corridors connecting highways to ports.

(Paragraph 4.6-4.7)

- Due to delays in implementation, only one of the 11 rail connectivity projects and two out of 22 road connectivity projects at ports could be completed by March 2009, as planned.

(Paragraph 4.5 and 4.8)

Recommendations

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

Performance indicators

- Performance targets set by the Ministry through Memoranda of Understanding with the ports remained mere upgrades of the previous years' performances and were not based on any norms. The standards of performance also varied from port to port.

(Paragraph 5.1 and 5.2)

- At Haldia, the targets allowed 42 *per cent* idle time at the berths while at Mumbai, the targets for equipment utilisation were less than 20 *per cent* of the total working time. In contravention of Ministry's stipulations against lowering performance targets, several ports viz. Haldia, JNPT, NMPT and Visakhapatnam reduced the targets of PBD and TRT in their MoUs.

(Paragraph 5.2 and 5.2.4)

- Important performance parameters such as pre-berthing detention and turn-round time were not being recorded and reported correctly by most of the ports. The segregation of these parameters into 'port account' and 'non-port account' to identify the delays under separate heads, was not done.

(Paragraph 5.3)

- For computing berth occupancy, a berth occupied for even an hour was shown to have been occupied for the whole day. Thus, relatively idle berths reported high occupancy. In Cochin, a berth showing 100 *per cent* occupancy was found to be actually occupied for only 16 *per cent* of the time, when computed in hours. Similarly, at New Mangalore, a berth showing 60 *per cent* occupancy actually handled only nine vessels in two months. Moreover, several investment decisions like widening and reconstruction of berths were based on inaccurately reported high occupancy rates of berths.

(Paragraph 5.5)

- The mode of calculation of the handling capacity of the berths did not represent the optimum handling possible at those berths but was based on actual handling done in previous years. The existing inefficiencies were, therefore, factored into the calculation, due to which most of the ports were reporting high capacity utilisation.

(Paragraph 5.6)

Recommendations

- *The Ministry should consider computation of berth occupancy in hours. Capital expenditure decisions on new berths should be based on the occupancy and utilisation figures of the existing berths in hours.*
- *Capacity should be objectively assessed based on the capacities of equipment and other infrastructural facilities and should not merely reflect the handling done during the earlier years.*
- *The Ministry should ensure correct reporting of pre-berthing detention and turn-round time by the ports.*

- *All major ports should adhere to the defined common minimum standards of performance based on the output of standard equipment under normal working conditions without making allowances for deficiencies.*

- *In the case of equipment, the ports should adopt measures like prioritization and synchronization of maintenance schedule, proper inventory management, timely cargo aggregation and disposal of obsolete/surplus equipment, without undue delays in achieving better availability and utilisation, rather than lowering the targets to indicate achievements.*

Schemes undertaken

- The National Maritime Development Programme drawn up by the Ministry of Shipping in 2005-06 envisaged spending about Rs 27075 crore in the implementation of 170 infrastructure augmentation projects which were planned under the first phase to be completed by March 2009. However, progress on implementation was marred by delays at various stages and only 31, i.e. 18 *per cent* of the projects could be completed.

(Paragraph 6.1 and 6.2)

- Out of 26 ongoing schemes, 18 schemes were delayed by over a year due to delays in approvals of the schemes at various levels. Implementation of schemes was poor at JNPT, Kandla, Mormugao, Mumbai, New Mangalore, and Visakhapatnam.

(Paragraph 6.2.1)

- Adequate priority was not accorded to the most critical projects like deepening and connectivity projects, which were the main responsibility of the ports under the 'landlord' model. Only two out of the 15 deepening schemes planned for Phase- I of National Maritime Development Programme could be completed.

(Paragraph 6.2.2)

- The progress of schemes planned for privatisation of commercial services, mainly in the nature of building and operation of terminals under lease, was also slow due to delays in handing over of sites, grants of security clearances, etc. Only one out of the seven terminals planned could be completed by March 2009.

(Paragraph 6.3)

- The minimum performance prescribed for the private operators under the Build Operate Transfer (BOT) agreements varied widely and was not properly benchmarked.

(Paragraph 6.3.2- 6.3.4)

Recommendations

- *The Ministry should formulate a clear time schedule for all stages of schemes and concerted efforts should be made to implement these schemes in a time-bound manner.*
- *Planning by individual ports should be aligned to the National Maritime Development Programme, which is a national Plan document. Integration with other national Plans like that of the Railways and National Highways Authority of India should also be considered.*
- *While framing BOT agreements, performance benchmarks need to be fixed as per identified best practices. The Ministry should play an active role in identification of such best practices.*

1 INTRODUCTION

1.1 Ports and the Indian Economy

Ports play a pivotal role in stimulating economic activity in their surroundings and hinterland through the promotion of seaborne trade. In India, they handle 95 *per cent* of the country's international trade cargo by volume and 70 *per cent* by value. The sector is broadly categorised into major and non-major[1a] ports. There are 12 major ports, out of which 11 function as autonomous bodies under the Ministry of Shipping[1b] (Ministry), Government of India and are governed by the Major Port Trusts (MPT) Act, 1963. The twelfth major port, located at Ennore, is a corporatised one under the same Ministry. Apart from these, there are 187 notified non-major ports across 13 maritime States. The 12 major ports handle about three- fourths of the cargo traffic of the country. These ports handled 383.75 million tonnes (MT) of cargo in 2004-05. Anticipating a rapid rise in traffic along with robust growth of the economy, the Ministry drew up (2005-06) the National Maritime Development Programme (NMDP). The objective of NMDP was to increase the capacity of major ports to 650.90 MT by March 2009. During 2008-09, the actual handling by the ports rose to 530.37 MT against a reported capacity of 576.09 MT of cargo, registering a 38 *per cent* rise in volume in five years. The cargo-mix is shown in Fig 1.1.

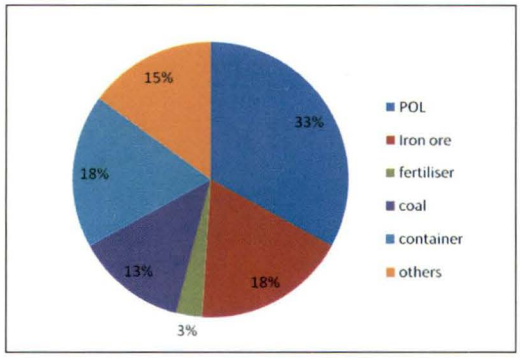


Fig 1.1

1.2 Profiles of Major Ports

The 11 major ports are strategically located along the 7517 km coastline of India with six ports on the west and five on the east coast, having a shared hinterland. The first six autonomous port trusts set up under the MPT Act 1963 included the three legacy ports of Chennai, Kolkata and Mumbai along with the ports of Cochin, Tuticorin and Visakhapatnam. Subsequently, five other ports viz. Jawaharlal Nehru Port (JNPT), Kandla, Mormugao, New Mangalore and Paradip were added to the list. A brief profile of these ports is presented overleaf.

[1a]Non-major ports include minor ports, notified under the Indian Ports Act, 1908 and managed by State Maritime Boards, intermediate ports developed under public-private partnerships and private ports. The cargo share of the non- major ports in Gujarat was 75 *per cent* of the total volume handled at all non-major ports in India in 2008-09.

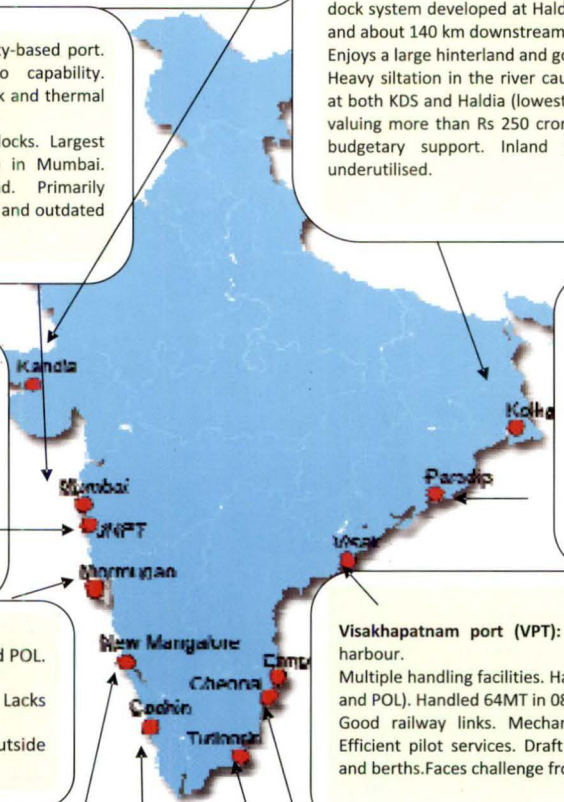
[1b] Erstwhile Ministry of Shipping Road Transport and Highways.

Major ports at a glance

Kandla port (KPT): (Gulf of Kutch)
Multicargo handling facilities. Handles POL (62%), fertilizers, foodgrains and salt. Handled 72 MT in 08-09, the highest in India.
Has sufficient land for expansion. Lacks depth.
Faces stiff competition from ports like Sikka and Mundra developed by Gujarat Maritime Board and upcoming private ports like Pipavav and Hazira.

Kolkata port (KoPT): Old riverine port with long channel (232km). Multicargo facilities. Handles POL, iron ore and coking coal at Haldia, and containers at Kolkata Dock System (KDS). Handled 54 MT in 08-09, ranking fifth in India.
Impounded dock systems with locks. Satellite impounded dock system developed at Haldia in 1977, closer to the sea and about 140 km downstream of KDS.
Enjoys a large hinterland and good rail connectivity.
Heavy siltation in the river causes severe depth limitation at both KDS and Haldia (lowest in India) .Regular dredging, valuing more than Rs 250 crore, is carried out with 100% budgetary support. Inland waterway connectivity, is underutilised.

Mumbai port (MbPT): Old city-based port. Natural harbour. Multicargo capability. Handles POL (60%), break bulk and thermal coal. Handled 52 MT in 08-09.
Three enclosed docks with locks. Largest holder of property (753 ha) in Mumbai. Huge immediate hinterland. Primarily suffers from depth limitations and outdated equipment.



Jawaharlal Nehru port (JNPT):
Came up in 1989.
India's premier container port. Handles 60% of all containers. Handled 52 MT in 08-09.
Shares access channel with Mumbai. Highly efficient container handling. Lacks depth.

Paradip port (PPT):
Handles dry bulk (94%) like coal, iron ore and fertilizers. Handled 46 MT in 08-09.
Located near mineral rich hinterland, Needs to improve connectivity, mechanisation and labour productivity.

Mormugao port (MGPT):
Handles iron ore (80%), coal and POL. Handled 42 MT in 08-09.
Enjoys good inland waterways. Lacks road and rail connectivity.
Part loading of vessels occur outside the berths for lack of depth.

Visakhapatnam port (VPT): Deep water port at outer harbour.
Multiple handling facilities. Handles dry bulk (iron ore, coal and POL). Handled 64MT in 08-09, second highest in India.
Good railway links. Mechanised handling of iron ore.
Efficient pilot services. Draft mismatch between channel and berths.Faces challenge from Gangavaram port.

New Mangalore port (NMPT): Deep water port handling POL, iron ore, coking coal and other dry bulk. Handled 36 MT in 08-09. Calling vessels suffer high turn-round time. Dry bulk handling facilities are non-mechanised.

Chennai port (ChPT): Old city based port. Has 24 berths in three docks and multiple cargo capability. Handles containers (35%), POL, coal, automobiles. Handled 57 MT in 08-09, third highest in India.
Enjoys depth and connectivity.
Depth mismatch between channel and berths, handling inefficiency and road traffic restrictions. Dust pollution is a major concern.

Cochin port (CoPT): On Willingdon island. Berths on two backwater channels. Handles POL (73%) and containers. Handled 15 MT in 08-09, lowest in India. Volumes stagnant for last three years. Lies close to the international east-west shipping route and plans to become a major international trans-shipment hub. International container terminal being developed.
Lacks depth and has outdated equipment (94 %),
Poor rail links and labour productivity.

Tuticorin port (TPT): Artificial harbour with eight berths. Handles thermal coal, containers and general cargo. Handled 22 MT in 2008-09.
Close to international shipping route
High efficiency in container handling,
Does not need regular dredging due to rocky bed.
Suffers from depth limitations and inadequate rail links.

1.3 Recent Developments

Among the major ports, wide variations in performance and productivity were noticed due to differences in the nature of cargo handled, nautical access, economies of scale and frequency of ship calls. To transform Indian ports into world-class facilities suited to the requirements of the future, the Ministry mandated that each major port should develop its own long-term business plan. The Port of Rotterdam was appointed as an adviser to the Ministry to review the process of development of the business plans. Subsequently, each of the ports engaged consortia of national and international consultants to prepare their business plans. The exercise was completed in 2007. SWOT analyses done for the ports indicated, *inter alia*, that they were suffering from limited water depths, old infrastructure, inefficient handling systems, poor hinterland connectivity, overstaffing and poor quality of services. The study also indicated that the dominant market share of the huge Indian hinterland and locational advantages were among the primary strengths of these ports.

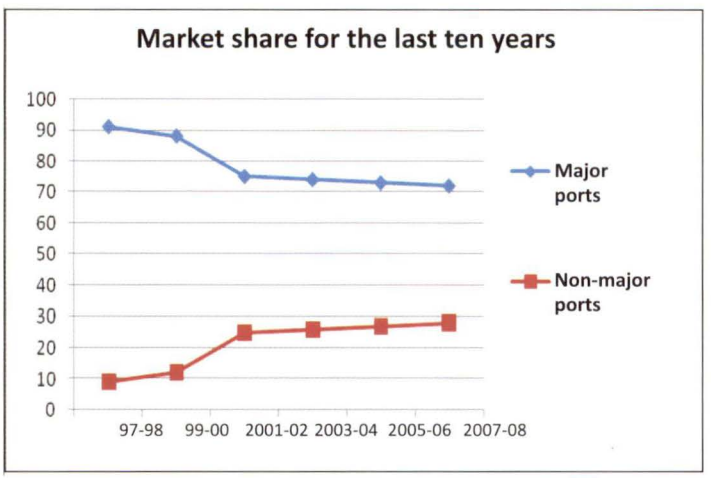


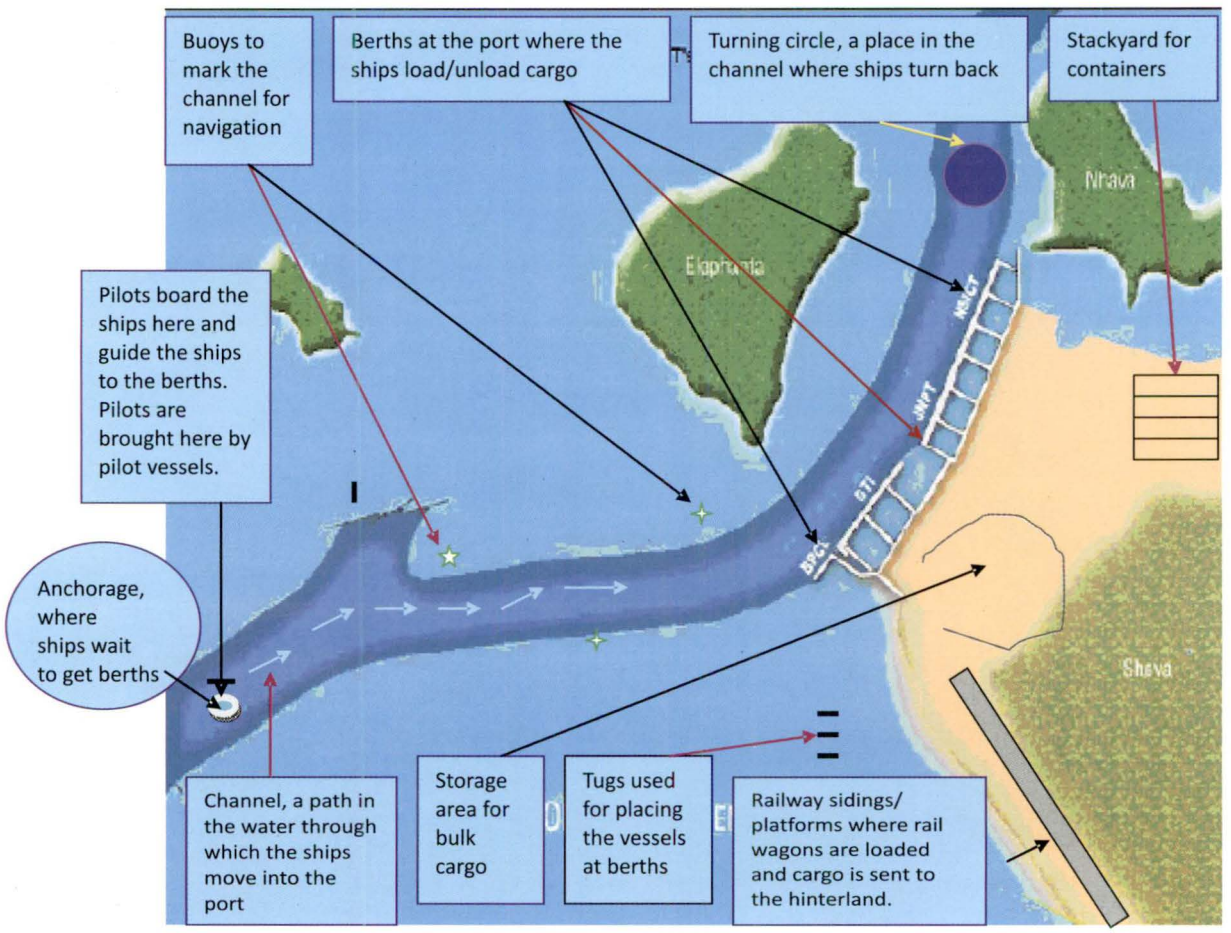
Fig 1.2

It is, however, important to note that the market share of the major ports have steadily declined over the last 10 years (see Fig 1.2) in the face of growing competition from the rapidly developing non-major ports. Keeping in view the prominence that the major ports have enjoyed in India's economic development, the scenario of steady decline in cargo share at major ports and weaknesses in the implementation of capacity augmentation schemes, the Government formulated (2006) NMDP to facilitate enhanced private investment, improve service quality and promote competitiveness by identifying specific schemes/projects and other measures. The schemes were planned to be implemented in two overlapping phases: Phase I (2005-2009) and Phase II (2007-2012). Although most of the ports had drawn up ambitious[2] long- term plans, there were a number of material issues that affected their service delivery. To analyse such issues, a performance audit of the functioning of these major ports was taken up in August 2008.

[2]In their vision statements included in their business plans, most ports aimed to develop themselves as hub ports in the South Asian region, handling trans-shipment cargo. However, big shipping lines do not prefer Indian ports as trans-shipment bases due to depth limitations and inefficiencies.

1.4 Layout of a Port

The layout of a typical major port (JNPT shown here) along with the main activity locations is given below:



1.5 Audit Objectives

The performance audit of major port trusts was conducted to assess whether

- marine services were delivered in an efficient and effective manner.
- cargo handling services were efficient, effective and economical.
- efficient port connectivity and storage infrastructure were available vis-à-vis the volume of business and future plans.
- performance benchmarks set by the Ministry induced improvements in operational efficiency and were reported and monitored correctly.
- capacity augmentation schemes taken up under the National Maritime Development Programme were implemented in an efficient and effective manner.

1.6 Scope

The performance audit covers the 11 major ports which function as autonomous bodies under the Ministry. The corporatised Ennore port has been kept out of the purview of this audit. The report covers performance issues relating to the period from 2004 to 2009. Matters relating to tariff fixation, financial management and estate management have not been included.

1.7 Audit Criteria

The following audit criteria were used in the preparation of the performance report:

- Operational targets specified by the Ministry in their annual MOUs[3] with ports
- Targeted capacity additions and time schedules for schemes under NMDP
- Global efficiency benchmarks for handling major categories of cargo
- Depth targets set by ports in dredging contracts
- Best practices at select terminals and ports in India

1.8 Audit Methodology

The performance audit commenced with entry conferences with the Managements of all the major ports where the audit objectives and scope were explained and the audit criteria were agreed upon. The concerns of the users of each port were identified through surveys. During the field work, operational data was collected and audit memoranda were issued. Two months, viz.

[3]Every year, the Ministry enters into Memoranda of Understanding with ports, to fix operational and financial targets.

July and December 2007 were selected for detailed test-checking of vessel-related data. The audit teams also conducted physical inspections of port facilities. Observations relating to each port were issued separately. Replies were received from the Managements of nine ports[4] and have been suitably incorporated in the report. The draft report was issued to the Ministry and an exit conference was held in June 2009. The replies of the Ministry were received in August 2009 and have also been suitably incorporated in the report.

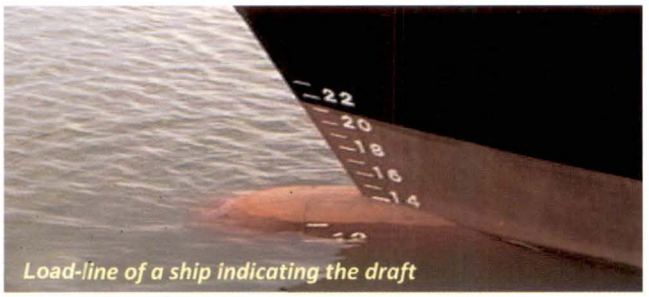
1.9 Acknowledgement

We thank the Managements of the major ports and the Ministry for extending their cooperation and support during the course of this audit.

[4]Cochin, Chennai, Kandla, Kolkata, Mormugao, Mumbai, New Mangalore, Tuticorin and Visakhapatnam.

2 Marine Operations

Marine operations constitute a set of services provided by ports to facilitate smooth movement of vessels between anchorage points and berths as described below:



Load-line of a ship indicating the draft

- The ports should ensure that the access channels to the dock systems and berths are maintained at their reported depths so that the movement of vessels visiting the ports is not restricted due to unavailability of adequate draft[5].

- The visiting vessels should be guided through these channels by pilots to ensure safe navigability. As per the provisions of the Indian Port Act 1908, all visiting vessels of more than 200 GRT[6] are required to engage the services of pilots available at the ports.


Tugs placing a vessel at berth at Tuticorin port

It is also imperative that tugs should be engaged for proper placement of vessels at the time of berthing/de-berthing, shifting, turning, and movement through narrow channels. Delays in provision of pilotage services and tugs add to pre-berthing detention (PBD)[7] and increased turn-round time (TRT)[8]. Detention of vessels affects shipping schedules and inventories of shippers. It also results in higher vessel hiring charges for cargo operators, which are added to the prices of cargo at the destination.

- Ports should ensure that adequate navigational aids like buoys[9], signals and communication systems for night navigation are made available for accessibility round the clock and ensure smooth allotment of berths for cargo handling.

Audit examined the issues affecting efficiency and effectiveness in respect of marine operations at major ports. The findings are discussed in the succeeding paragraphs:

[5]Depth necessary to submerge a ship to her load-line. It determines the minimum depth of water required for safe navigation.

[6]Gross Registered Tonnage: All cargo vessels other than small barges meet this criteria

[7]Time for which a ship waits before getting entry into a berth.

[8]Total time spent by a ship since its entry till its departure. i.e the time taken by a vessel moving from anchorage to berth and returning to anchorage after completing cargo handling operations.

[9]Floating devices used as sea marks to aid pilotage by marking maritime access channels.

2.1 Adequacy of Draft

The average size of vessels plying on international routes registered an increasing trend from 68000 – 92000 DWT[10] in 2003-04 to 76000 – 108000 DWT in 2007-08.

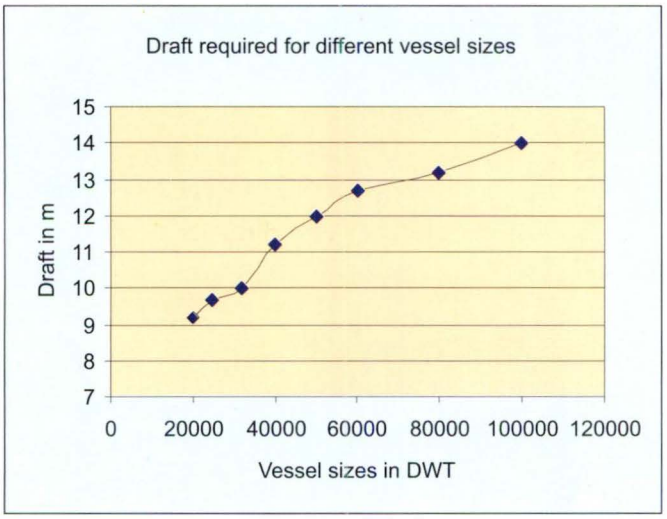


Fig 2.1

NMDP envisaged a draft of 13 to 14 metres or more for accommodating such types of vessels (See Fig 2.1). An Inter-Ministerial Group (IMG) constituted (March 2006) under the Committee on Infrastructure[11] recommended achieving a 14 metre draft at all ports by December 2008. Further, NMDP also envisioned that deep drafts were necessary at the ports to compete with other international ports in the region. At the ports of Colombo and Singapore, which acted as the primary trans-shipment[12] ports for cargo originating at or destined for India, draft of 14-16 metres was being maintained, thereby allowing all classes of ships to enter them. It was, therefore, imperative that the access channels and harbours of the nation's major ports should be made deep enough to handle all classes of vessels.

2.1.1 Draft unavailable for vessels plying international routes

Audit observed that out of the 11 ports, access channels at only three ports, viz. Chennai, New Mangalore and Vishakhapatnam (outer harbour) had the requisite draft to cater to vessels of current sizes. Most of the ports had multiple access channels. Kolkata Port comprised two dock systems, viz the Kolkata Dock System (KDS) and the Haldia Dock Complex (HDC) both having different access channels. Cochin port had three access channels viz Mattanchery channel (MC), an outer channel (OC) and the Ernakulam channel (EC). JNPT had a common channel (CC) with

[10]Dead weight tonnage - the carrying capacity of a ship (stores, fuel and cargo), expressed in tonnes.

[11]The Committee on Infrastructure, under the Chairmanship of the Prime Minister, was constituted on 31st August 2004 with the objective of initiating policies that would ensure time-bound creation of world class infrastructure delivering services matching international standards, developing structures that would maximize the role of public-private partnership (PPPs) and monitoring progress of key infrastructure projects to ensure that established targets were realized.

[12]Shipment of goods to an intermediate destination and then from there to another destination. The main revenue at the ports of Colombo, Singapore and Dubai comes from trans-shipment where cargo is transferred from feeder vessels to large ocean-going vessels.

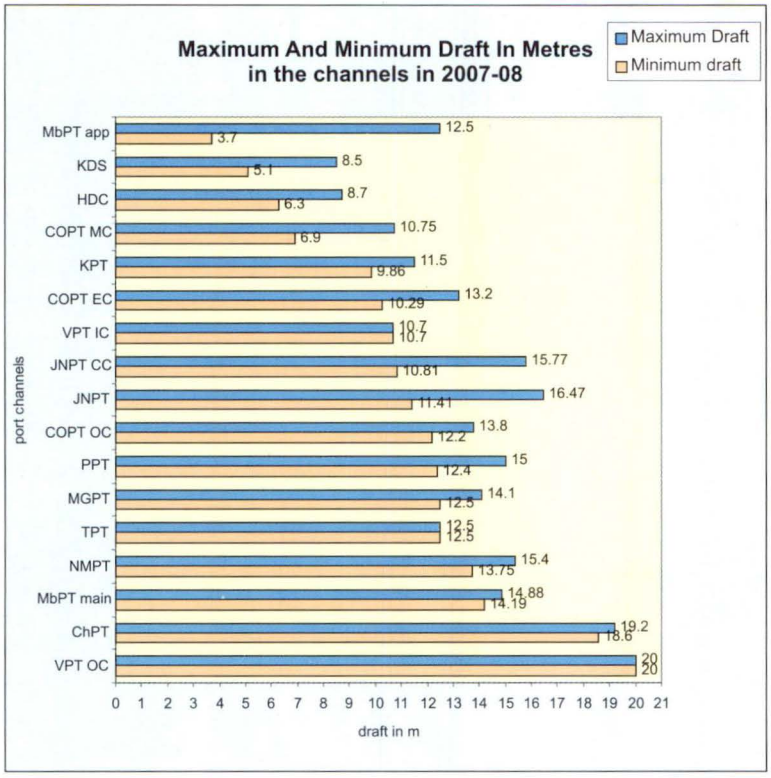


Fig 2.2

Mumbai port, apart from its own. Mumbai port had an access channel in addition to its own main channel. Vishakapatnam had an outer channel for the berths in the outer harbour followed by an inner channel for the berths in the inner harbour. The maximum and minimum drafts available at the channels providing access to the ports were as described in Fig 2.2.

In the eight other ports including JNPT, India's biggest container port, access remained largely restricted to vessels of smaller size that were less than 60000 DWT, due to lack of adequate draft. Vessels requiring higher draft could only access ports after performing lighterage[13] or uptopping[14] operations outside the harbour. The extent of such operations on visiting vessels in 2007-08 ranged from 2.5 *per cent* at Kandla to about 21 *per cent* at Haldia. Lighterage and uptopping contributed to high TRTs[15] of vessels.

The Ministry, in its reply, stated (August 2009) that greater efforts would be required to maintain drafts of 14 metres at ports as recommended by IMG. Capital dredging projects had been taken up in seven ports during 2007-10, viz. Cochin, Haldia, JNPT, Kandla, Mumbai, New

[13]Partial unloading of a vessel outside the harbour to reduce its draft, enabling access to berths.

[14]Loading of remainder cargo on to a vessel to its capacity, outside the harbour.

[15]Data on TRTs: Port-wise TRTs are shown in the chapter on performance benchmarks.

Mangalore, and Paradip. Although deepening schemes in these ports were envisioned under NMDP for completion by March 2009, it was noticed that except for one scheme of deepening in New Mangalore port, all the remaining schemes were significantly delayed and still to be completed (March 2009).

2.1.2 Reported depths did not provide adequate assurance to vessels

Reliability of draft is important so that ship operators can maintain voyage schedules and shippers can effectively manage their inventories. Audit scrutiny of vessel visits during 2007-08 revealed that only a minor share of vessels were of sizes compatible with the maximum drafts reported by each of the ports. The following table (2.1) shows significant variations between the reported[16] and the actual utilized drafts across all major ports including the three that had declared drafts deep enough to cater to vessels of current sizes.

Maximum drafts reported by ports and highest draft vessels that berthed in 2007-08

Port	No of vessels in 2007-08	Reported draft (max) in metres	Highest draft vessel (draft in metres)	Percentage of vessels within one metre of the highest draft vessel
Chennai	2053	19.2	17	2
Cochin	1171	13.8	12.5	7.6
JNPT	2712	16.47	12.6	4
Kolkata	1040	8.5	8.2	26
Haldia	2343	8.7	8.7	11
Mumbai	6150	14.88	14.6	3
New Mangalore	1166	15.4	14	14
Paradip	1655	15	12.5	4
Tuticorin	1602	12.5	10.9	1
Vishakhapatnam (Outer Harbour)	2346	20	17	2.7
Vishakhapatnam (Inner Harbour)		11.8	10.8	18

Table 2.1

In the case of Cochin, out of 142 vessels which visited the port during the sample months of July and December 2007, only 24 had drafts above 10.5 metres. Reported drafts, therefore, did not provide adequate assurance to vessels calling at the major ports. Port users in Mumbai and Tuticorin stated (December 2008) that the actual drafts were much less than those reported by those ports. Even at New Mangalore, where the proportion of visits of high draft vessels vis-à-vis

[16]Draft availability is reported or declared to shipping agencies periodically by the ports through tide and draft tables.

the reported drafts were highest (about 14 *per cent*), the actual draft available during four months was found to be below the minimum draft (13.75 m), declared during 2007-08. This restricted the cargo load of crude oil tankers visiting the port.

2.1.3 Draft variations between channels and berths leaving limited berthing options

Audit observed that in five out of the 11 ports, viz. Chennai, Cochin, Kandla, Tuticorin and Visakhapatnam, there were significant mismatches between the drafts available at the berths and the channels. As a result, the drafts at the approach channels in these ports remained underutilized. The position in Chennai is illustrated in Fig 2.3.

The problem was further compounded by the prevalence of high draft variability among the berths within these ports that left shipping lines with limited berthing options.

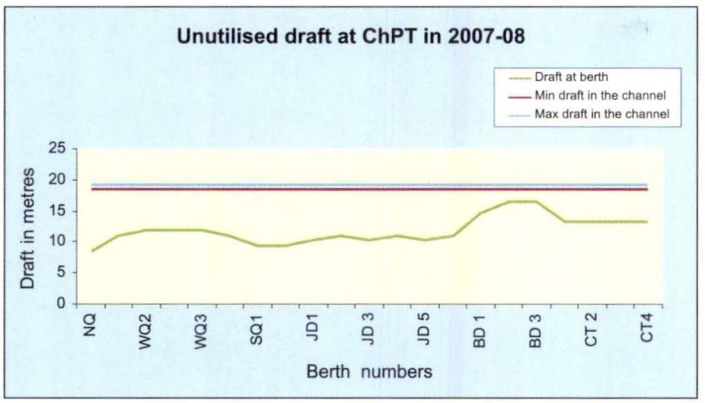


Fig 2.3

This resulted in the ships queuing up for a few berths leading to increased PBD and TRT of vessels. These problems were also pointed out by the port users in Chennai and Visakhapatnam. In the other six ports, the problem was not found to be significant. The user surveys conducted by Audit also indicated that draft reliability and timeliness of pilotage coupled with towage, navigational aids, etc were the major problems faced by the users of the major ports.

Thus, the issue of maintaining proper navigable drafts across major ports had not been addressed effectively. Inadequacy of draft had been one of the biggest limitations on efficient performance and development of trans-shipment volumes. Due to draft restrictions and wide variability, the major ports had been frequented by feeder vessels[17] up to the size of 12.5m. The restrictions imposed additional costs for vessels in terms of extra handling on trans-shipment or lighterage, additional trips or longer TRTs. With emerging competition from deep draft non- major ports in India, the share of these ports in the volume of Indian maritime cargo handled, may continue to decline.

[17] Large ocean going vessels known as mother vessels cannot enter all ports and visit only the bigger ports called hub ports. Cargo is shipped from these mother vessels to smaller ports in the vicinity in smaller vessels called feeder vessels.

The Ministry accepted the observation and stated (August 2009) that the draft variations were mainly due to siltation by natural causes and improper maintenance dredging. It stated that suitable plans needed to be drawn up by the ports to address the variability of drafts between the channel and berths, to signal certainty of drafts and to provide larger berthing options.

2.2 Survey and Dredging

As all major ports except Tuticorin port, which had a rocky seabed, were prone to siltation in different degrees, maintenance of appropriate navigable drafts posed a key business challenge to them. These ports were expected to maintain designed drafts by assessing dredging requirements through depth surveys and undertaking dredging work. Dredging is primarily of two types viz. maintenance dredging, which is a regular activity that ensures that channels and berths are maintained at the reported depth and capital dredging, which involves channel deepening and widening to accommodate larger vessels, with the aim of achieving larger economies of scale.

2.2.1 Non-standardization of survey affecting dredging assessments

For proper draft maintenance, depth surveys were being conducted in-house at most major ports (excepting Cochin, JNPT and Mormugao) for assessing dredging requirements. It was noticed in audit that although the echo sounding[18] method was in use, the survey process was not standardized across the ports. Frequency of surveys ranged from twice in a week at Paradip to once in two to five years at Tuticorin. At Vishakhapatnam no survey had been conducted for two and a half years. Further, it was noticed in audit that in two out of the 11 ports, viz. New Mangalore and Mumbai, the dredging volumes awarded in the contracts were not based on survey assessments. At New Mangalore, the dredging volumes were estimated on the basis of previously executed quantities in spite of regular surveys. In the case of Mumbai, the differences between the survey estimates and the quantities in the dredging contracts differed by as much as 29 *per cent* during 2004-05.

[18]Procedure for measuring depth by emitting sounds from the water surface to the bottom and measuring the time taken in receiving the echoes.

2.2.2 Inadequate management of maintenance dredging

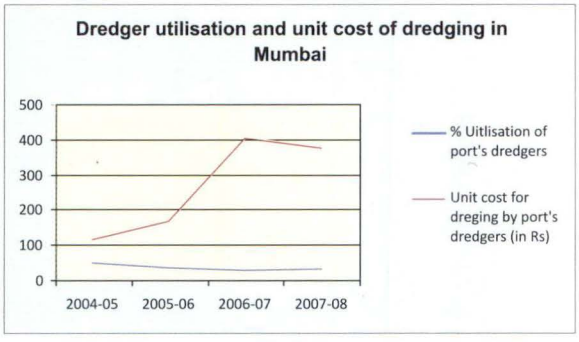


Fig 2.4

For carrying out maintenance dredging, all the ports except Mormugao had their own dredgers. It was observed in audit that the dredgers owned by the ports remained grossly underutilized.

As the overhead expenditure on such dredgers remained almost fixed, their low utilization resulted in high cost of dredging per unit volume dredged by port-owned dredgers. (See example of Mumbai in Fig 2.4). This statistic was then used by the ports to justify hiring of dredgers at lower unit costs. For example, at Cochin, the port's dredger was engaged for 235 days in 2005-06. It dredged 1.099 mcum[19] at a unit cost of Rs 62 per cum at 65 *per cent* utilization. In the subsequent year, the dredger was engaged for only 160 days to dredge 0.639 mcum. Both the percentage utilization and quantity dredged dropped sharply and the unit rate of dredging shot up to Rs 108 per cum. The port, while justifying the underutilisation of the dredger, stated (May 2009) that the dredger, being very old, was utilised after observing the norms of routine lay-offs during holidays and for annual surveys. In Chennai port also, hiring of dredgers was done and the port's own dredgers remained underutilised.

It was noticed that all ports, except Tuticorin, which has a rocky seabed, resorted to hiring of dredgers for carrying out maintenance dredging. Although, the Major ports were having the options to hire parties for dredging by inviting open competitive bids, the Dredging Corporation of India (DCI), a public sector undertaking was, however, having an edge over others as the Government reserved the right to assign any dredging contract to it in public interest. At Kolkata port, which required intensive dredging throughout the year and which was mandated by the Ministry to engage DCI alone, the required draft could not be maintained in 2007-08 in spite of the contract having a 'guaranteed depth'[20] clause. Due to falls in the draft, even smaller vessels could not comfortably access the port during February 2008. The navigability at Haldia also emerged as a serious cause of concern in 2008 and the port had to resort to emergency measures. In reply, the Kolkata port stated (June 2009) that due to DCI's inability to provide adequate numbers of dredgers, as per the contractual obligation, during the last few years, the depth at the governing bars[21] in the channel had fallen.

[19] million cubic metres

[20] A clause in a dredging contract which binds the agency to guarantee the achievement of an agreed depth, failing which the agency can be penalized.

[21] Raised portions of land in the river bed. Some of the bars along the main channel determine the effective draft that can be availed of. These are called governing bars.

As seen from Figure 2.5, the rates for maintenance dredging varied amongst the ports.

It was also noticed that DCI's rates varied widely from port to port. Further, the dredging contract agreements were not standardized and in general, failed to incentivise the achievement of the required depths. In the case of daily-rated contracts[22], none of the ports had conditions to take into account the speed of the dredgers, hopper leakages[23] etc. Such conditions were included in unit rate contracts only at New Mangalore and Mormugao. Density based restrictions for unit rated contracts were included only at Paradip and Chennai. The minimum daily targets were also different for the ports. In the case of New Mangalore, the minimum daily target was 85000 cum against 21000 cum at Paradip.

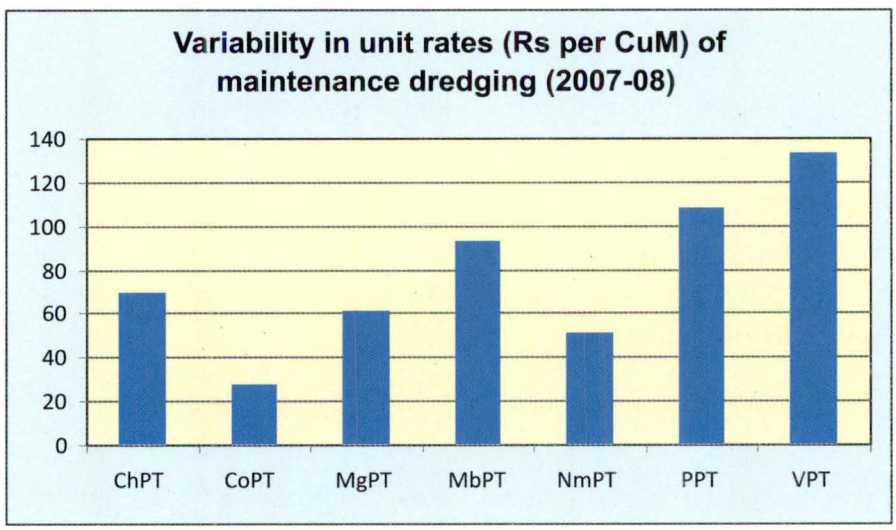


Fig 2.5

The above observations indicate that the issue of maintenance dredging had not been addressed effectively by the ports. Further, the policy of the Government of India restrained the ports from exploring other options or engaging firms of international repute for maintaining the channel. The Ministry stated (June 2009) during the exit conference, that DCI itself was facing capacity constraints and that the ports were being encouraged to explore other options, including global bidding. The Ministry stated (August 2009) in its reply, that improper maintenance dredging was adding to the siltation problem and dredging projects were also being delayed due to non-availability of bigger dredgers and quality services. This buttresses the need for a more open dredging policy to explore best resources worldwide.

[22]The dredging contracts were primarily of three types: unit rated, daily-rated and daily-rated with depth-guaranteed clauses.

[23]Compartments in a dredger for storing dredged material. In cases where the hoppers leak, the dredged material falls back into the channel, reducing the effectiveness of dredging.

Dredging contracts: A case study

- At Cochin Port Trust, nearly 30 *per cent* of the port's revenue excluding estate rental revenues was consumed on dredging. The share of dredging volume by the port's own dredgers was only five *per cent* at a capacity utilization of 50 *per cent* during 2003-08. The bulk of the dredging work was done through the engagement of private contractors.

- The port awarded maintenance dredging work to M/s Jaisu Shipping Co.Pvt.Ltd during the year 2007-08. As per the agreement, if the contractor failed to maintain the channels to the required width and depth, recovery was to be made at defined rates up to a maximum of four *per cent* for a shortfall of 0.9m to 1.2m below the target depth. Such low rates of penalty did not incentivise performance. Further, the penalty clause was also changed to favour the contractor. For example, in 2005-06, the penalty for non-achievement of the target was reduced by half as compared to the preceding year, without reasons. The leftover volumes of a year were carried forward to the dredging estimate for the next year, thereby inflating the value of the contract. Data on the size of vessels visiting during the last five years also indicated that the reported channel draft was underutilized and only three *per cent* of the vessels corresponded to draft of 11-12m. In reply, the port stated (May 2009) that to minimize the maintenance cost, the contract specified acceptance of a ruling shortfall upto 1.2 m at all locations and the contractor's failure to keep specified depths could not be construed as a violation of the contract. If the depths available were below the required draft, localized dredging together with the tidal window[24] was used to navigate the vessels having draft upto 12.5 m. The reply is not acceptable as it was the responsibility of the port to ensure the availability of the required draft. Resorting to localized dredging along with the tidal window to make up the shortfall in the required draft cannot be accepted as a standard practice. Besides, the clause regarding acceptance of 1.2 m shortfall failed to incentivise target achievement.

- Audit observed that the cost of annual maintenance dredging ranged from Rs 24.54 crore to Rs 30.90 crore during the period 2003-04 to 2006-07, which increased to Rs. 46.58 crore during 2007-08. It was noticed that the tendered cost during 2007-08 was exorbitant due to the high estimated cost of Rs. 40 crore which was based on budgetary offers from various dredging firms. As this was not a new work, the port should have worked out the estimated cost, taking into consideration the previous year's expenditure on the work and technical aspects during the ensuing year. The procedure adopted by the port resulted in unjustified estimated costs during 2007-08. This led to the abnormal increase in the contract price.

[24]The time period when higher draft is available due to high tide conditions.

In reply, the Management stated (May 2009) that as a claim from DCI for extra payment for the additional quantity dredged during 2006-07 was still pending and the completion cost was not available, it was not prudent to consider the contract with DCI as the base for the dredging estimate for 2007-08. The estimate was thus prepared on the basis of budgetary offers of DCI. The reply is not acceptable due the fact that the estimates should have been prepared considering the previous year's expenditure as the work was not new and could not have increased abnormally in the next year.

2.2.3 Few schemes for capital dredging

Although NMDP placed emphasis on capital dredging projects, it was found that only 15 such projects had been planned and no major project had been completed as of date. It was also noticed that the funds earmarked for capital dredging of 7 mcum at seven ports was Rs 137 crore as compared to the expenditure of Rs. 272 crore incurred on maintenance dredging of 2.7 mcum during the last 10 years.

Despite a global tender called in 2007 for a major deepening scheme at JNPT, the tender could not be finalized as the Ministry did not approve the award of the work because the lowest quotation received was above the estimated value of Rs 800 crore.

At Kolkata and Haldia which had long access channels prone to 'shoaling'[25] at particular stretches, a scheme for comprehensive river regulatory measures had not been approved by the Ministry even after 20 years of the initial proposal. The scheme, with an estimated cost of Rs 385 crore, was also included in the first phase (2005-2009) of NMDP. However, it was not taken up and the Kolkata port engaged (2009) Central Water and Power Research and Consultancy Services, (CWPRS), Pune for revalidation of the scheme under directions of the Ministry.

Recommendations

- *Concerted efforts should be made by the Ministry to ensure the minimum draft availability of 14 metres as recommended by the Inter-Ministerial Group. Assessment of dredging requirements should be made based on long-term planning and proper surveys with the help of specialized organizations like National Institute of Ocean Technology and Central Water and Power Research and Consultancy Services.*
- *The draft plan of each port, particularly those of Chennai, Cochin and Visakhapatnam should focus on addressing the significant mismatches of draft between approach channels and berths.*
- *As the present dredging policy of the Ministry compelled some ports to engage DCI in spite of the latter failing to meet targets, a clear cut policy ensuring competitive bidding should be formulated.*

[25] Gradual formation of sandbanks, thereby creating shallow water which is hazardous for ships.

2.3 Pilotage

According to the Indian Port Act, 1908 all vessels bigger than 200 Gross Registered Tonnage (GRT)[26] calling at a port have to compulsorily engage pilotage services. The optimum inventory of pilots, pilot vessels and tugs depends on the specific operating conditions at each port where issues like length of the access channel, extent of navigational hazards and the number of vessels handled during a certain period have to be factored into the calculation.

It was observed that the resources available at the ports were partly owned and partly hired, with Chennai, Kolkata, and Mumbai using lesser hired resources than JNPT, Mormugao and Tuticorin.

2.3.1 Promptness in providing pilotage

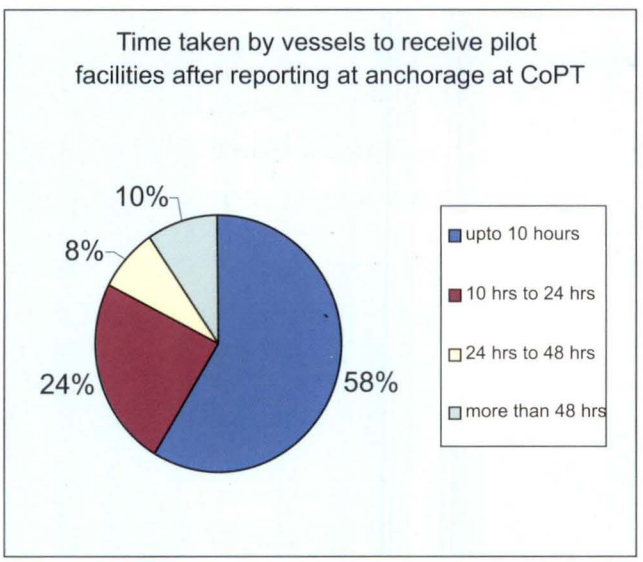


Fig 2.6

To avoid high detention of vessels, it is imperative that ports ensure that pilotage services are provided promptly for them. It was seen that the minimum time for providing pilotage varied from port to port depending on channel length, location of pilot station, etc. Any delay in providing pilotage at a port would be taken as the time taken for vessels to receive pilot facilities over and above the minimum time. In this regard, Audit observed the following:

- In four out of the 11 ports, viz. Chennai, Cochin, Kandla, and New Mangalore, there were significant delays in providing pilotage.
- At both New Mangalore and Cochin, against the minimum time of 10 and 40 minutes respectively, about 20 *per cent* and 18 *per cent* of the vessels received the facility after 24 hours. (See Fig 2.6 for Cochin as an example)
- At Chennai, against a minimum time of 2 hours and 23 minutes, about 40 *per cent* of the vessels received pilotage after 50 hours of arrival during July and December 2007.

[26]Weight of an empty vessel. The weight of 100 cubic feet of enclosed space in a ship is one vessel tonne.

At Kandla, against 45 minutes of minimum pilotage time, delays in providing pilot facilities were upto 10 days for the months of July and December 2007. A user survey at Kandla indicated that the availability of pilots was inadequate. At Haldia, although the port had a large inventory of pilotage facilities, detention of ships were reported due to unavailability of pilots.

The Ministry accepted (August 2009) the shortage of pilots in all the ports and stated that almost two-thirds of the pilots working in the ports were on contractual basis.

Good practices in India:

At **Visakhapatnam**, sample check in audit showed that the services were fairly prompt. Pilotage at VPT was provided between 15 minutes and three hours of the vessels calling at anchorage.This was being achieved despite the fact that the port had an old fleet of pilot vessels with nine pilots servicing 21 vessels per month on an average.

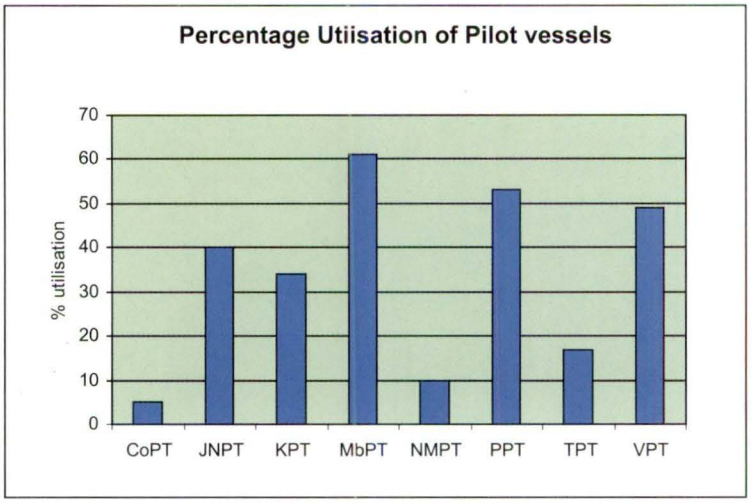


Fig 2.7

2.3.2 Low utilization and high maintenance cost incurred on old pilot vessels

The average age of the pilot vessel fleets (three to six in each port) was more than 10 years in all ports except Kandla and Paradip. Their utilization was found to be less than 50 *per cent* except in respect of Mumbai and Paradip as shown in Fig 2.7.

It was also noticed that the expenditure on maintenance of the vessel fleets increased sharply in the case of older vessels as shown in Fig 2.8. In three out of the 11 ports, viz. Mormugao, Mumbai and JNPT, where the average age of the vessels was above 15 years, the average maintenance expenditure per vessel ranged from Rs 48.50 lakh at JNPT to Rs 58.17 lakh at Mumbai.

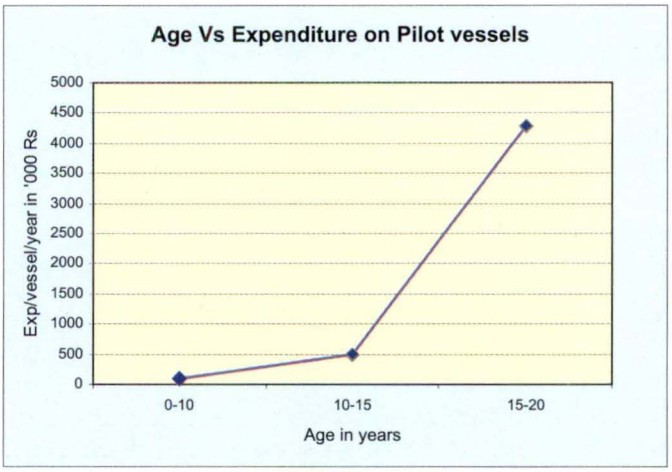


Fig 2.8

2.4 Night Navigation

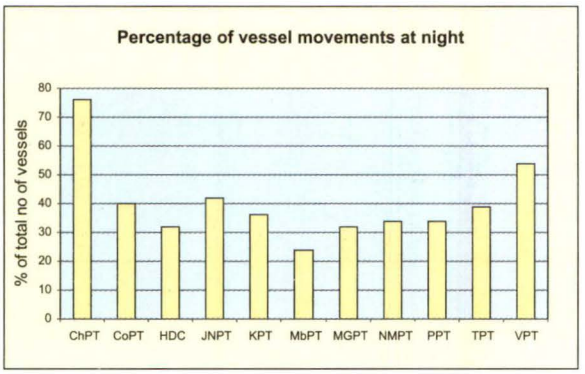


Fig 2.9

For ensuring smooth access to berths round the clock, the ports should provide proper facilities for night navigation like lights, lighted buoys, signals, pilots etc. It was observed that the proportion of vessel movements at night varied from port to port, being high in Chennai and Visakhapatnam and low in every other port as shown in Fig 2.9.

Facilities were found to be lacking particularly in Cochin, Kandla, Kolkata, Mumbai and Tuticorin. At Cochin, users stated that night navigation facility was not available in Matancherry wharf due to poor lighting of channels. In Kolkata, night navigation through the Kolkata channel in the upper reach (for about 42 miles) was not available due to the absence of proper lighting arrangements. At Kandla, there were restrictions on night navigation for vessels having draft of more than 10.2 m and LOA[27] of more than 200 metres. Kandla port suspended night navigation from December 2008 due to shortage of pilots. Users of Mumbai and Tuticorin ports pointed out (December 2008/January 2009) considerable delays in getting facilities (pilot, tugs etc.) at night. At Mumbai, the deployment of supervisory staff during the third shift[28] was less than the first shift. Users also pointed out that at JNPT, vessels up to LOA of 270m were permitted and 42 *per cent* of vessel movements took place at night. However, due to the restricted availability of facilities, there were PBDs of larger size vessels (having LOA beyond 270metres) arriving at the calling points at night.

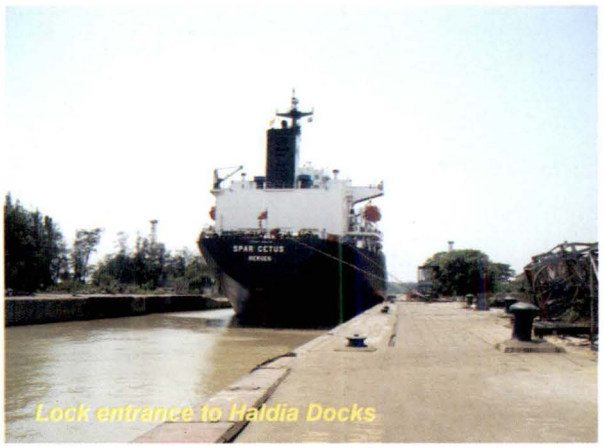
2.5 Lock Gate Systems

Among the ports, lock gate systems[29] for entry into the harbours were in use only in Mumbai and Kolkata Port.

[27]Linear measurement of a vessel indicating the maximum length of a ship.

[28]Daily work at ports is done in three eight-hour shifts. The night shift (10pm-6am) is referred to as the third shift.

[29]At impounded dock systems, a certain depth is maintained by restricting tidal variations and shoaling outside the harbor by means of multiple lock gates. Vessels can only access the harbour after passing through a narrow lock entrance channel when the gates are operated.



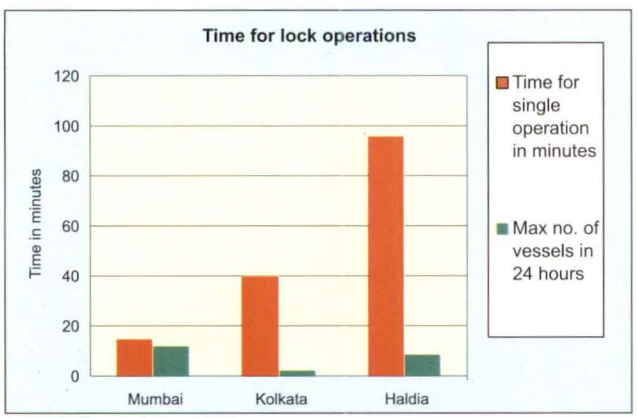


Fig 2.10

It was observed that inefficient operation of old lock gates at Kolkata Port both at KDS and HDC led to detention of vessels.

The average time taken to operate the lock gate system was highest at Haldia (96 minutes) whereas in Mumbai[30] it was minimum (15 minutes) as shown in Fig 2.10. This restricted the number of vessels that could enter or leave the port to eight per day. This resulted in high PBD (2.86 days) and TRT (4.26 days). To overcome this restriction, a second lock entrance had been planned under NMDP Phase–II, to be implemented during the period 2007-12.

2.6 Berthing

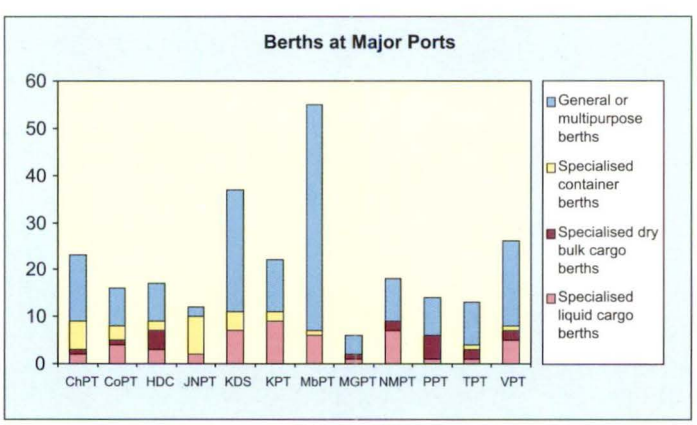


Fig 2.11

Berth allotment constitutes an integral part of marine services. When vessels call at anchorage, the marine department of each port allots berths for cargo handling operations.

The allotments are primarily dependent upon the availability of vacant berths, equipment support available in them and the type of cargo to

[30]Lock gates are in use at Indira Dock, Victoria Dock and Princess Docks at Mumbai.

be handled. With increased specialisation of the type of cargo, vessels prefer berths that have specialised cargo handling equipment, thereby facilitating efficient handling. Berths at major ports consist of specialised berths for handling liquid bulk, dry bulk and containerised cargo apart from general purpose berths (Fig 2.11). It was found that 50 *per cent* of the berths at all the ports except JNPT and Haldia belonged to the general category.

It was noticed that although the cargo mix at major ports showed that liquid bulk, dry bulk and containers were the three main types of cargo handled at the ports, the low proportion of specialised cargo berths resulted in queuing up of ships for such berths and consequent PBD.

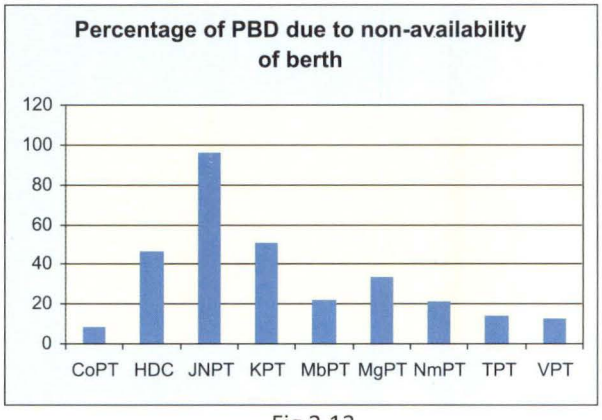


Fig 2.12

It was observed that a significant proportion of PBD was attributable to non-availability of berths as shown in Figure 2.12. It was also noticed that the PBD on all other factors attributable to the ports (port account) was not being identified and addressed by the ports.

At Visakhapatnam, the PBD for want of berths in 2007-08 was 8348 hours, amounting to 13.47 *per cent* of total PBD at the port in that year. It was found that vessels were detained at anchorage as the two preferred berths at the outer harbour (one being privately operated with better equipment support and the other being the only multi-cargo berth) were occupied.

Total PBD reported at major ports during July and Dec 2007	
PORT	Total PBD (in days)
CoPT	77
HDC	1247
JNPT	325
KPT	988
MbPT	262
MGPT	7
NMPT	113
TPT	401
VPT	563
Total	3983

Table 2.2

At Mumbai, it was found that more than one-third of the total ships which needed berthing at the chemical berth at New Pir Pau were detained for more than 24 hours due to non-availability of the berths.

Although a proposal for constructing a second chemical berth to reduce congestion was approved way back in 2002 and was also included in NMDP, it had not been implemented as of date.

The total PBD during the two sample months of 2007 was 3983 days (as shown in Table 2.2). This resulted in an additional cost burden on trade of more than Rs 1400 crore per annum.

Recommendations

- Proper efforts should be made to improve night navigation facilities in Cochin, Kandla, Kolkata, and Tuticorin.
- Factors leading to pre-berthing detentions on port account should be identified and addressed by the ports.

3 Handling Operations

All the 11 major ports had facilities to handle different types of cargo and they handled 530 MT of cargo in 2008-09.

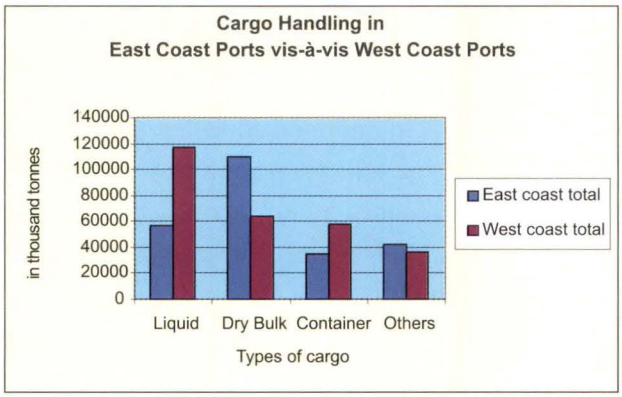


Fig 3.1

The nature of cargo was categorised into liquid bulk[31], dry bulk[32], containers[33] and break bulk[34] cargo. In terms of actual handling, the predominant share in the cargo mix was liquid bulk for Kandla, Mumbai, Cochin and New Mangalore, dry bulk for Mormugao and Paradip and containers for JNPT. Other ports handled multiple cargo types in relatively even proportions. Four ports on the east coast, viz. Chennai, Kolkata, Paradip, and Visakhapatnam played a predominant role in handling dry bulk. Dry bulk handling at Kolkata Port Trust was mainly carried out at the Haldia Dock Complex. The other three types of cargo were mainly handled at the six ports on the west coast (Fig 3.1) with JNPT alone handling 60 *per cent* of the total containers during 2008-09.

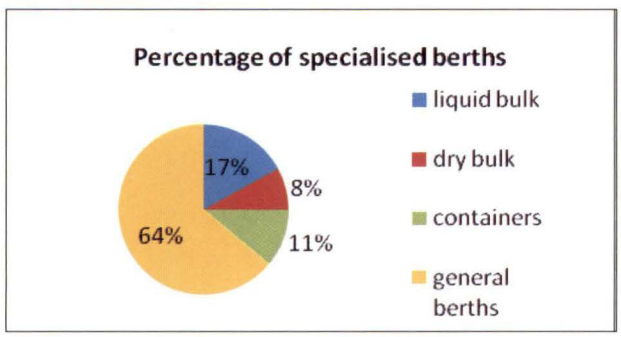


Fig 3.2

The nature of cargo has nowadays become specialized with POL, dry bulk (mainly iron ore, coal and fertilizers) and containers comprising more than 85 *per cent* of the traffic at ports. With increasing containerization of cargo globally, the share of break bulk cargo, which involves labour intensive handling, is presently as low as six *per cent* in India. For increasing handling efficiency, it is imperative that the ports create specialised high capacity berths, supported by modern equipment and an efficient labour force. It was, however, noticed (See Fig 3.2) that the share of specialised berths at the major ports was low, with 64 *per cent* of the berths being of

[31] Petroleum oil and lubricants (POL), liquid chemicals, etc
[32] Coal, iron ore, alumina, fertilizers, etc.
[33] Standardised boxes measuring 20 feet or 40 feet in length carrying a variety of cargo.
[34] Cargo shipped in non- standard packages, e.g.: project cargo, steel components, etc.

general[35] nature. Only in the case of liquid bulk cargo, almost the entire handling was occurring at specialized berths and Single Buoy Moorings (SBM[36]). The factors that affected efficient handling of each type of cargo were examined in audit and the findings are discussed below:

3.1 Liquid Bulk

Liquid cargo being transferred via Marine loading arms at JNPT

For handling of liquid bulk, all ports had specialised berths where marine loading arms (MLAs[37]) had been installed. During 2007-08, 44 such berths handled 125 MT of liquid cargo with significant handling occurring in five out of 11 ports, viz. Haldia, Kandla, New Mangalore, Mumbai and Visakhapatnam as shown in Fig 3.3. Although 1.05 MT of liquid cargo was handled during 2007-08 at the Kolkata Dock System, no MLAs were installed there.

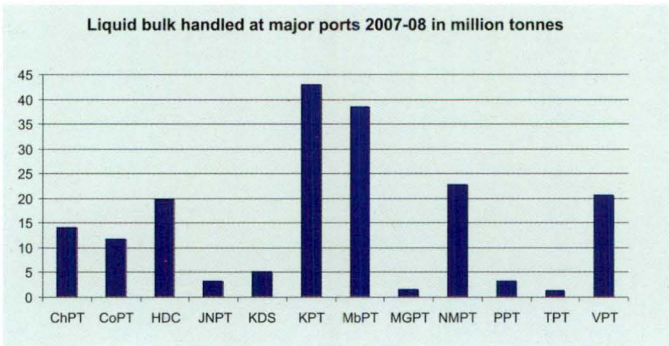


Fig 3.3

Apart from this, 28.6 MT of POL was handled at three offshore SBMs at Kandla, which was the highest liquid bulk handling port. More than 90 per cent of the liquid cargo was handled in specialised berths or SBMs. The average TRT of liquid bulk vessels, however, ranged from 1.76 days at JNPT to 5.59 days at Tuticorin (See Fig 3.4).

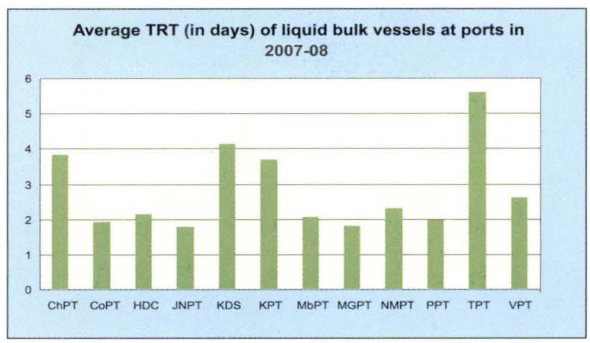


Fig 3.4

[35] Berths with equipment support that enable handling of various categories of cargo.

[36] Offshore handling facility where a temporary floating platform with pipe arrangement allows removal of cargo while a ship is anchored in the sea with the help of tugs.

[37] Specialised equipment installed at berths, connected to pipelines that enable transfer of liquid bulk cargo between a vessel and a storage tank. Capacity of an MLA is expressed in tonnes per hour. A specialised liquid berth has 3-5 MLAs.

3.1.1 Low capacity utilization of marine loading arms

For efficient handling, it is imperative that the MLAs have adequate throughput capacity which is higher than the pump capacity[38] of the liquid bulk vessels. The actual discharge rates depend on other parameters like size, distance and height of storage tanks, draft availability at the berths and size of the vessels.

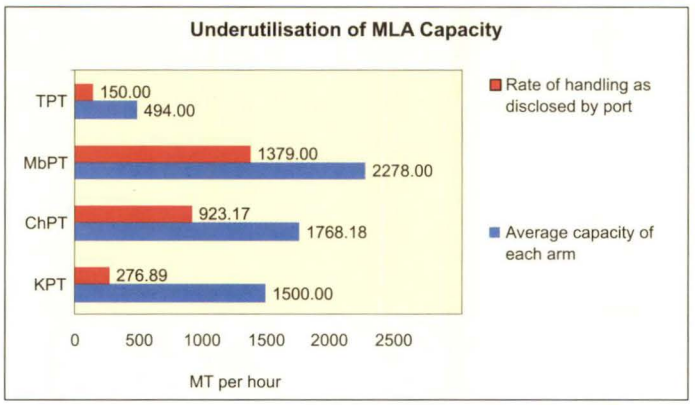


Fig 3.5

It was, however, found that in four out of 11 ports, viz. Chennai, Kandla, Mumbai and Tuticorin, which handled close to 30 *per cent* of the liquid bulk traffic, the actual rates of discharge along MLAs were significantly below capacity (See Fig 3.5).

Underutilisation of capacity of MLAs was 39 *per cent* at Mumbai to 70 *per cent* at Tuticorin, indicating inefficient handling at these ports, resulting in higher TRT. The significant low actual rate of discharge at Kandla was due to the fact that none of the seven MLAs at the liquid berths was in working condition since 2001-02. The six specialised berths at Kandla handled 22 *per cent* (9.59 MT) of liquid cargo in 2007-08 whereas the three SBMs there, handled 67 *per cent* (28.6 MT) at an average of 9.5 MT per SBM. In Mumbai, the actual discharge was low due to the low receiving capacity of the refineries. The Mumbai port, in its reply, accepted (June 2009) the observation and stated that the low discharge rates at certain cases were also due to the pump capacity of the vessels. Moreover, the port could not decide the rates of transfer independently as the users, viz. the oil companies, planned the rates of handling based on their resources and the port was maintaining the system to ensure maximum utilisation.

3.1.2 Inadequate handling infrastructure

It was observed that the installed discharge capacity of the MLAs at all the ports was less than 2000 tonnes per hour except at Mumbai. Further, at Tuticorin, the capacity of the loading arms was significantly lower than that at other ports. Thus, only vessels of smaller size could be handled at these ports. Low discharge capacity of the arms resulted in higher TRT of these vessels during the sample months, when compared to Mumbai, which handled vessels of similar size at berth no JD-2. The details are provided in Table 3.1 below:

[38] For efficient transfer, the capacity of MLAs must match those of the vessel pumps (2500 tonnes per hour (TPH) for mid-sized tankers that commonly call at Indian ports.)

Capacity of Marine Loading Arms and TRT (sample months July 2007 and December 2007)

Port /Berth	Quantity handled in MT	No of MLAs	Capacity of MLAs (tonnes/hr)	Avg size of vessels July 2007(GRT)	TRT in days in July 2007	Avg size of vessels December 2007(GRT)	TRT in days in December 2007
Mumbai/JD-1	3.891	5	2000	34500	2.3	32000	1.91
Mumbai/JD-2	1.29	3	2000	20000	1.9	13000	2.07
Mumbai/JD-3	4.73	5	2000	35000	1.78	34000	2.19
Mumbai/JD-4	13.444	5	3000	62000	1.58	57000	1.57
Tuticorin/B1	0.481	5	275-600	11000	2.38	11000	3.06

Table – 3.1

At the Kolkata Dock System, the liquid bulk vessels were constrained by the low drafts and faced inadequate handling infrastructure. As a result, 72 *per cent* of the handling was occurring at the anchorage and particular locations on the access channel, resulting in high TRT (4.1 days compared to 1.76 days at JNPT) of liquid bulk vessels.

The Ministry replied (August 2009) that the number of vessels calling at some ports was low and there was not much waiting time for such vessels. As the revamping of the MLAs was capital intensive in nature, ports were revamping them according to their requirements. While the Ministry's argument is valid to some extent, it, however, needs to be stressed that in ports like Mumbai where large volume of liquid cargo was handled, investment in revamping of MLAs at berths with low capacity would result in efficiency gains in operation. Further, in ports where the volumes handled are presently low, improvements in handling efficiency are necessary for them to remain competitive.

It was found in Cochin that liquid cargo was being backloaded followed by diversion to other ports. The details are given below:

Backloading of crude at Cochin:

At Cochin port, backloading of crude/POL took place when there was excess receipt of crude oil from the SBM as compared to KRL[39] storage capacity. The excess quantity of crude was backloaded to Mangalore or Mumbai refineries through NTB and COT berths and handling charges at Rs 65 per tonne were fully waived to relieve the port users from making double payments on the ground that wharfage on this account had already been collected at the SBM. The action of Cochin port was not justified as the handling charges collected at the SBM were Rs 25 per tonne whereas wharfage on the quantity backloaded from the berths was leviable at Rs 65 per tonne, resulting in a loss of Rs 40 per tonne. Moreover, the berths were also engaged in multiple handling of the same cargo, already handled once at the SBM.

[39] Kochi Refineries Limited

The port, in its reply, stated (May 2009) that the decision to waive wharfage for backloaded POL was taken to reduce idling at the liquid berth in the post-SBM scenario and ensure revenue from vessel-related charges for additional throughput proposed by KRL. While the port's effort to utilise the idle berth was understandable, the argument regarding additional revenue was not acceptable as the port's revenue expectation of additional throughput at the SBM did not actually materialise.

The Ministry stated (August 2009) that the backloading of cargo was an essential operation and was planned so as to ensure minimum berth occupancy. The fact, however, remains that due to infrastructural constraints, multiple handling had to be done resulting in increased berth occupancy. Consequently, the port also suffered financially due to lower rates allowed for the SBM on one hand and for their inability to use their berths on the other hand.

3.1.3 Draft restrictions compelling shift to SBMs and other ports

At the Haldia Dock Systems at Kolkata, which ranked fifth among the major ports in terms of volume (19.66 MT) of liquid bulk handled in 2007-08, draft restrictions above eight metres at the two oil jetties together with inefficient handling had become serious limitations to smooth operations. The principal user, Indian Oil Corporation Limited (IOCL), shifted (November 2008) its handling operation to Paradip port in Orissa even though the cargo would eventually come to IOCL's storage facilities at Haldia through underground pipelines. The port had failed to take any proactive action to minimise the significant business loss.

Even at Cochin, the single largest customer, KRL, shifted (December 2007) the handling point from the liquid berths dedicated to them since 1986 to the SBM. The shift resulted in reduction of revenue along with idling of the berths. Even the business plan of Cochin port had identified that the port's revenues were linked to the capacity of KRL refinery.

3.1.4 System of measurement of liquid cargo not standardised

For safeguarding the financial interests of the ports and for making inter-port comparisons meaningful, the method of measurement of volume of handling of liquid cargo and the system of billing should have been standardised. It was, however, found that the method varied from port to port as shown in Table 3.2 below:

Names of the ports	Method of measurement/ documents accepted for verification	Figures accepted for billing purposes
Chennai	Ship- Captains' and users' certificates	Manifested quantities in import applications, Outturn Report, bill of lading and approved surveyor report.
Cochin	Requisitions filed by importers	Importers' quantities

Haldia, Paradip, Tuticorin	Ullage[40] report of the independent surveyors	Ullage quantity
JNPT	Bills of lading of Customs and ullage reports of independent surveyors	Higher quantity between BL and ullage quantity
Kandla, Mormugao	Outturn reports of oil companies	Outturn reports of oil companies
Kolkata	Ullage survey	Outturn reports of oil companies
Mumbai	Quantity shown in Import General Manifest	Quantity shown in Import General Manifest
New Mangalore	International standard draft survey	Measured quantity
Vizag	Displacement method (ship figure)	Ship discharge quantities

Table 3.2

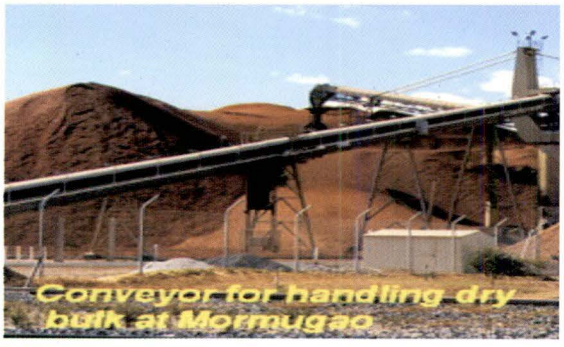
The absence of any standard norm for measurement of liquid bulk resulted in discrepancies between the actual cargo handled and the quantities billed. In Chennai, a discrepancy of Rs.87.90 lakh in collection of revenue was noticed during the years 2006-07 and 2007-08. The port, in its reply, accepted (June 2009) the discrepancy, stating that it was due to data entry mismatch, and assured that the differences would be reconciled.

Recommendations

- Ports should address the problem of under-utilisation of existing discharge capacities of Marine Loading Arms. To reduce TRT of liquid vessels, low capacity MLAs should be replaced with high capacity arms.
- Adequate draft for tankers should be maintained to avoid unnecessary diversion of cargo.
- The Ministry should fix a standard system of measurement of liquid cargo and notify a standard document for verification of the quantities handled and claiming of wharfage.

3.2 Dry Bulk

Dry bulk cargo constituted 40.55 *per cent* of the total cargo handled at major ports by volume in 2007-08.



Conveyor for handling dry bulk at Mormugao

Dry bulk unloading into conveyors at Tuticorin

[40] Empty space available inside fuel tanks. The ullage quantity indicates the volume of oil cargo that has been transferred out/into the fuel tank.

The ports on the eastern coast played a predominant role by handling 65.92 *per cent* of this quantity (see Fig 3.6).

In Mormugao, Paradip, Tuticorin and Visakhapatnam, dry bulk cargo constituted 94, 91, 56 and 64 *per cent* of the total cargo respectively.

3.2.1 Large volume handled at non-mechanized berths

For ensuring efficient handling of this type of cargo, it was necessary that specialized mechanised berths[41] were available in the ports. It was, however, found that handling of dry bulk at the ports was predominantly being carried out by non-mechanised means that included multiple handling.

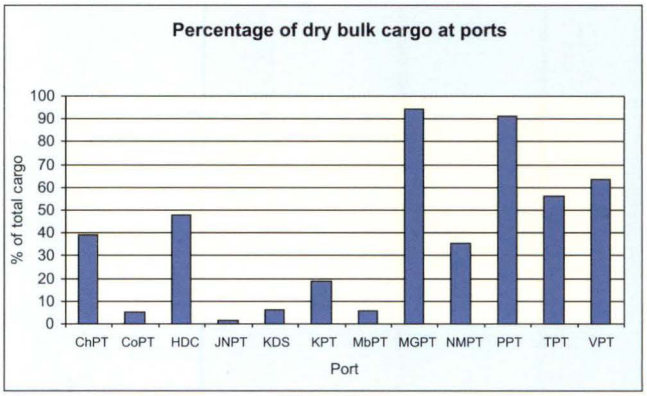
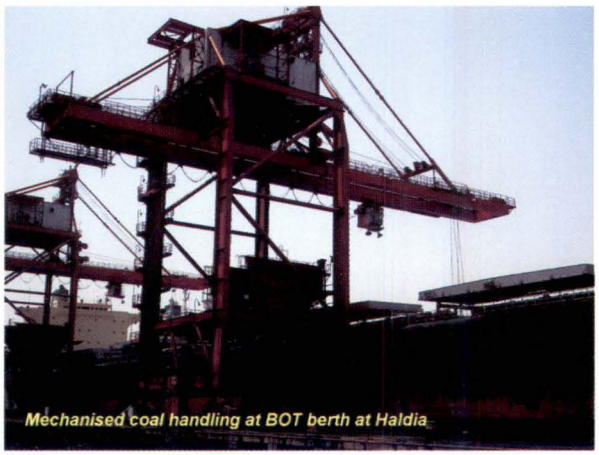
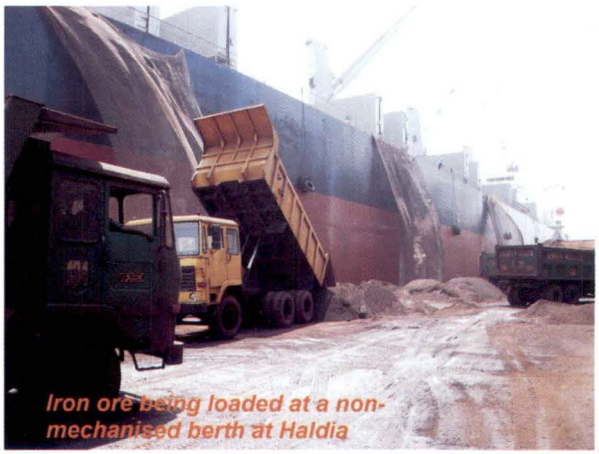


Fig 3.6


Mechanised coal handling at BOT berth at Haldia


Iron ore being loaded at a non-mechanised berth at Haldia

Although dry bulk constituted more than 40 *per cent* share of cargo by volume, only eight *per cent* of the berths were specialised dry bulk berths. In three out of 11 ports handling dry bulk, viz. JNPT, Kandla and Mumbai, there were no mechanised berths. In the eight other ports, there were 19 specialised berths for handling dry bulk, which had mechanised facilities. It was noticed that only 37 *per cent* of the dry bulk cargo was handled at these 19 mechanised berths. In 2007-08, 125 MT of dry bulk cargo was handled at non-mechanised berths.

This indicated significant inefficiencies in the handling of dry bulk at the ports.

[41] Berths fitted with conveyor systems connecting them to stackyards and handling plants. Non- mechanized berths transfer the cargo from the stackyards to tippler trucks to the quays. The material is then aggregated with the help of dozers, picked and loaded on to the ships by the use of the ships' own gear (grabs). Such multiple handling is avoided at mechanised berths.

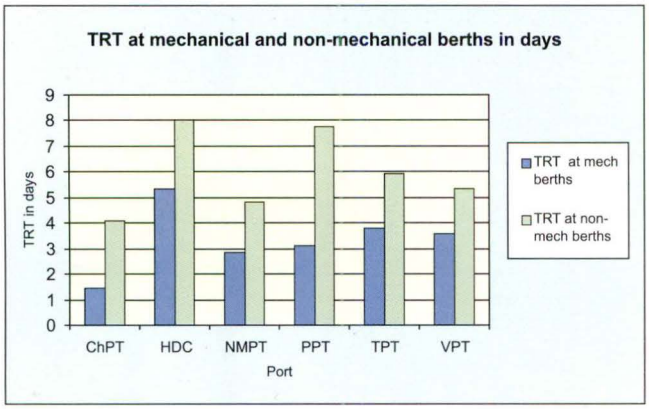
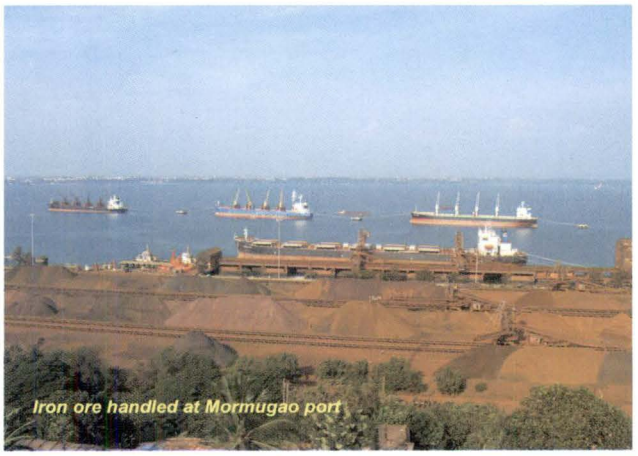


Fig 3.7

Audit scrutiny of six major dry bulk handling ports such as Chennai, Haldia, New Mangalore Paradip, Tuticorin and Visakhapatnam revealed that dry bulk vessels faced higher TRT at non-mechanised berths during 2007-08, as shown in Figure 3.7.


Iron ore handled at Mormugao port

The business plans of three of these ports, viz. New Mangalore, Paradip and Visakhapatnam also identified non-mechanised dry bulk handling as a critical weakness in them. Tuticorin port accepted the audit observation and stated (April 2008) that more mechanised berths were being planned for the future. They also stated that as and when specific proposals for privatisation of bulk cargo handling were received, they would be examined in conformity with the Government's policy on public private partnership (PPP) projects.

Recommendation

- *Dry bulk should be handled exclusively in specialised berths with mechanised handling facilities to arrest the increasing trend of TRT of dry bulk vessels.*

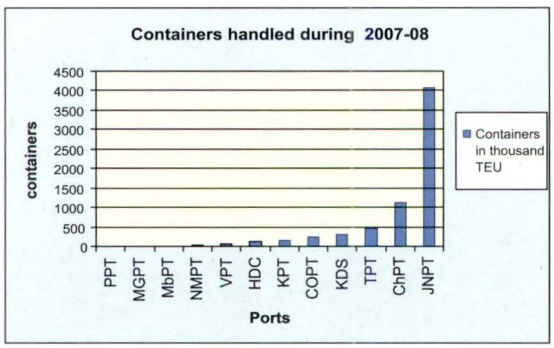
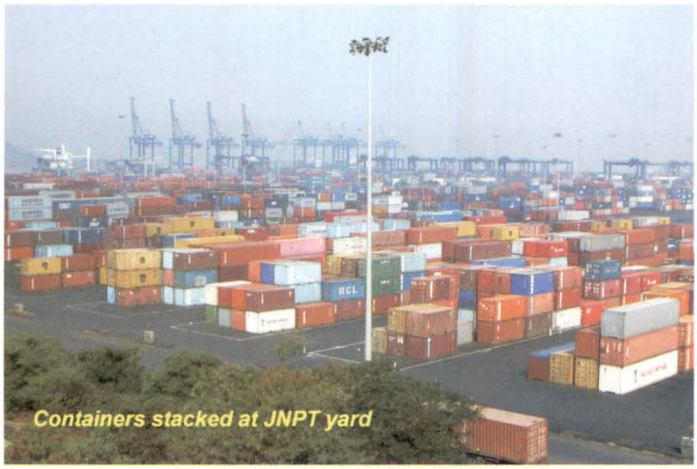


Fig 3.8

3.3 Containers

With the rising global trend towards containerization, the major ports witnessed a significant increase in container traffic by 72 *per cent* during the performance audit period. The volumes were, however, driven by JNPT which alone handled 60 *per cent* of the total containers arriving at these ports during 2007-08 (Fig 3.8)

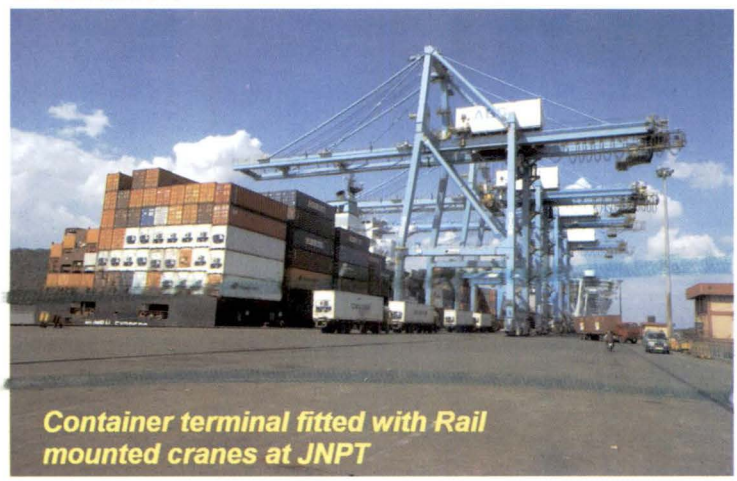
Three other ports viz. Chennai, Kolkata, and Visakhapatnam also witnessed very high growth rates during 2003-2008. Despite the high growth of containerized cargo, only five ports viz. Chennai, Cochin, JNPT, Kolkata and Tuticorin, handled significant volumes of this emerging variety of cargo. Handling was mostly done at 28 specialized berths at eight out of the 11 ports with the exception of Mormugao, New Mangalore and Paradip. It was noticed that although five ports, viz. Chennai, JNPT, Kandla, Mormugao and Mumbai had planned schemes costing Rs.3079 crore for increasing their container handling capacity by 2009, only one new container terminal[42] at JNPT had come up till March 2009. Construction of terminals at Chennai, Kandla and Mumbai were under progress.



Containers stacked at JNPT yard

3.3.1 High performance achieved in select container terminals

The container handling capacity of a port is determined by several parameters which, *inter alia*, include the number of specialised terminals, the quay lengths of the same, the number of shore cranes, the size of container stack yards and the ratio of shore to yard equipment. The efficiency in handling containers depends on the speed of movement of the cranes and the optimal equipment ratio and is measured in terms of moves per crane hour, TEUs per metre length of quay and the number of vessels handled with the least possible TRT. It was, therefore, imperative that the ports created optimal handling facilities for efficient handling of containers.



Container terminal fitted with Rail mounted cranes at JNPT

It was found that the handling efficiency achieved at some of the container terminals, especially the privately operated ones at JNPT and Tuticorin, compared favourably with international benchmarks.

The status of container handling facilities along with the volumes handled at the five main container ports in 2007-08 is shown in Table 3.3 below:

[42] A contiguous set of berths handling containers collectively known as a terminal.

Table 3.3: Handling performance at the main container terminals at major ports							
Terminals at ports	No of berths	No of quay cranes	No. of yard equipment[43]	Total TEUs handled in 07-08	TEUs handled per berth in 07-08	No of moves per crane hour as per Ministry's report (norm[44] = 25)	TEUs handled per metre quay length as per Ministry's report (norm[45]=1500)
Chennai	6	7	24	1052993	175499	21	1267
Cochin	3	4	11	253715	84572	14.6	469
GTICT[46]	3	8	36	1290862	430287	23.7	1813
JNPCT	3	8	23	1260923	420308	16.2	1756
Kolkata	4	2	16	297287	74322	19.5	NA
NSICT[47]	2	8	35	1508056	754028	23	2513
Tuticorin	1	3	9	450398	450398	27	1283

Only two ports, JNPT and Tuticorin, handled more than four lakh containers per berth as may be seen from Fig- 3.9.

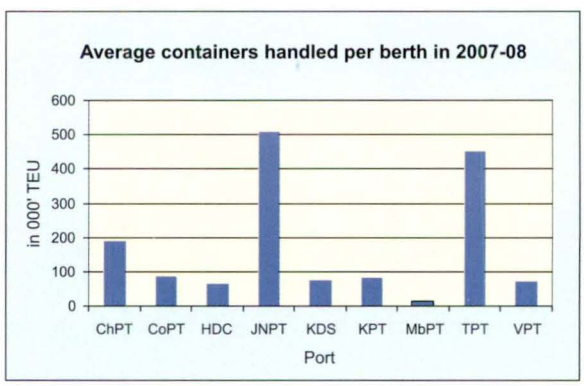


Fig 3.9

[47]The privately operated terminals at these two ports registered higher performance. The port operated terminal at JNPT achieved high handling efficiency. It was noticed that with identical equipment support and larger yard space, JNPCT, the port operated terminal at JNPT, showed 3.38 *per cent* reduction of containers during 2007-08 against 10.96 *per cent* increase at the adjoining NSICT, a privately operated terminal at JNPT. In the case of Cochin, where the container terminal was under private operation, the operational parameters were much below all the benchmarks as seen in Table-3.3. The nature of the agreement[48] with the operator at Cochin also failed to incentivise high standards of performance. It was also noticed that other major container handling ports like Chennai, Cochin and Kolkata registered lower TEUs per berth. An important factor for such low handling was that the terminals at these ports had less equipment support and the equipment ratios per berth and yard were less than that at JNPT or Tuticorin.

[43] Rubber Tyred Gantry Cranes (RTGC), Rail Mounted Gantry Cranes (RMGCs), Reach Stackers

[44] Crane moves per hour norm taken from the Port of Rotterdam Advisory Report, 2007.

[45] TEUs handled per metre quay length, Norm taken from UK benchmark (consultant's study report, Port of Chennai)

[46] Gateway Terminals India Container Terminal - privately operated.

[47] Nhava Sheva International Container Terminal – privately operated.

[48] Deficiencies in the licence agreement at Cochin have been separately commented upon in the chapter on implementation of schemes in this report.

Although Kandla had a good ratio of berth and shore cranes, it handled only 165092 TEU containers during 2007-08. This indicated underutilization of facilities and called for optimization of the container handling operations at Kandla. It was found that Mumbai port suffered a steady decline in the volume of containers handled during the period covered in the report (40.15 *per cent* during 2003-08). The port outsourced its entire container handling operations to a private operator from June 2008 onwards.

3.3.2 Variations in standards for conversion of container TEUs to tonnes

In order to exhibit a port's performance, the number of container TEUs handled is expressed in terms of volume, i.e tonnage handled. Although the Ministry had set a conversion norm where one TEU should be taken as 12.5 MT on an average, different ports adopted different conversion factors, leaving no scope for comparing their performance. Audit observed that during the period from 2003-04 to 2007-08, ports adopted variable conversion factors in determining their performance, as evident from Table 3.4 below:

Table 3.4: Factors used for conversion from TEUs to tonnes

Chennai	Cochin	JNPT	Kandla	KDS	Mormugao	Mumbai	New Mangalore	Paradip	Tuticorin	Visakhapatnam
16	12-13	12-13	14-16	14-17	10-12	12-14	14-16	14-16	11–13	13-16

As a result of adopting different standards, the reported tonnage handled differed from the actual volume of containerized cargo handled by these ports. As per the Ministry's instructions (2002) regarding standardization of definitions and concepts for reporting port performance, the tare weight of containers was not to be included in the commodity-wise traffic handled for export and import except for computing container traffic, where tare weight had been included for estimation purposes. It was, however, observed that at Tuticorin, the tare weight of the containers was being taken into account for computation of the port's performance, resulting in overstatement of cargo by 73977 tonnes and 71329 tonnes in July 2007 and December 2007 respectively. Moreover, due to inclusion of empty containers in the total figure for cargo handling, the total handling was inflated by 4.7 MT during the period 2003-08.

Tuticorin port stated (June 2009) that no specific instructions had been received from the Ministry in this regard. The reply was, however, not acceptable as the practice was in contravention of the Ministry's guidelines and the inclusion of empty containers was against the benchmark for operational efficiency as stated in the consolidated business plan for major ports made by the Port of Rotterdam.

Recommendations

- *With the increasing trend of containerisation of cargo, ports should create facilities of specialised container berths. Possibilities for conversion of existing general cargo berths into such berths should be explored.*
- *Equipment ratios between berths and yards should be enhanced to the levels of JNPT and Tuticorin at ports having significant container cargo.*
- *The Ministry should fix a standard conversion factor for computation of tonnage from TEUs handled at ports so that performance reports are not distorted.*

3.4 Adequacy of Equipment Support

The major ports, so far, have followed a service model[49] orientation where the port authorities have taken upon themselves, the responsibility of cargo handling and maintenance of equipment. All the ports owned and maintained large fleets of equipment which, *inter alia,* included a variety of shore cranes, yard cranes, trucks, pay loaders, and stackers. The numbers of equipment owned were particularly high in the older city-based ports of Kolkata and Mumbai, which had large numbers of general cargo berths.

3.4.1 Old and outlived equipment

As handling efficiency and in turn, the TRTs of vessels depended on the nature of equipment support, it was necessary for the ports to ensure the availability of suitable and well-maintained equipment.

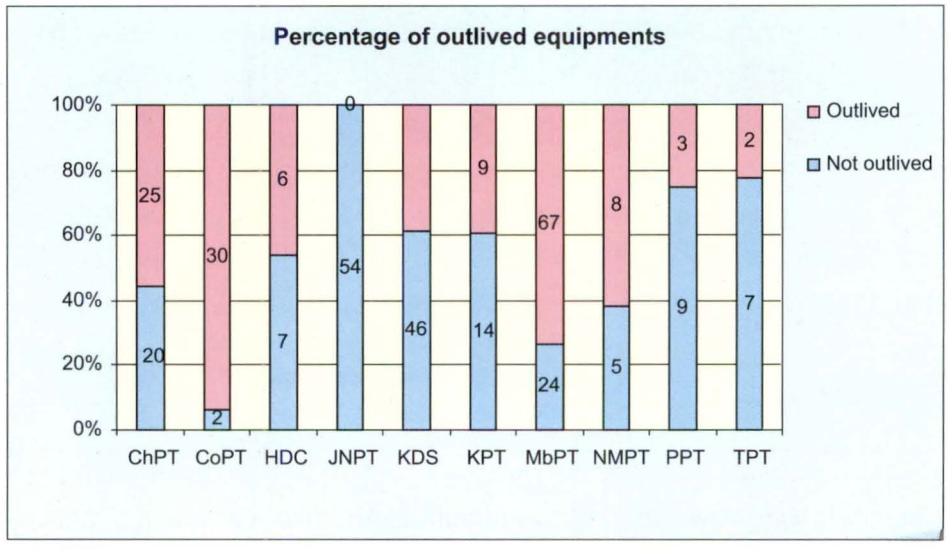


Fig 3.10

[49] A business model traditionally followed by ports the world over where responsibility of all commercial operations like cargo handling, storage etc is taken upon by the ports themselves.


Old equipment at Haldia

It was found that in all the ports except JNPT, 55 per cent of the equipment were existing beyond their economic life. The presence of outlived equipment varied from 22 *per cent* at Tuticorin to 94 *per cent* at Cochin (see Fig 3.10.). The position was far worse in the case of dry bulk cargo handling equipment[50]. Kolkata, Mumbai and JNPT had no ancillary equipment for handling of dry bulk. At Tuticorin, which had one fully mechanized and one semi-mechanized berth for handling dry bulk that accounted for 56 *per cent* of cargo, there was no ancillary equipment other than one grab crane, although dry bulk was the major cargo handled there. The users at Tuticorin were using private equipment for handling. Except for three pieces of equipment in Paradip and two at Cochin, all dry bulk handling equipment in the ports were outlived. In all, 94 *per cent* of the ancillary equipment for handling of dry bulk at ports had crossed their economic life on or before 2007-08.

Table 3.5 :Availability and utilisation of port owned equipment (2007-08)

Major Ports	Average availability (Ministry norm: minimum 90%)	Average utilisation (Ministry norm: minimum 60%)
Chennai	65.00	15.60
Cochin	84.42	15.54
Kandla	94.00	52.00
Kolkata	66.92	26.10
Mormugao	88.60	20.80
Mumbai	79.00	18.00
New Mangalore	96.74	10.75
Paradip	71.60	21.73
Tuticorin	97.19	42.36
Visakhapatnam	90.70	39.52

3.4.2 Low demand for port equipment and hiring from private parties

It was noticed that although the ports were ensuring high availability of shore cranes, yard cranes, pay-loaders, top lift truck, fork lifts etc, their average utilisation was very low in eight ports[51].

This indicated their unsuitability and low demand for port-owned equipment. The availability and utilisation of port-owned equipment during 2007-08 was as shown in Table 3.5 .

It is evident from the table that three ports, viz. Kandla, Tuticorin and Visakhapatnam could ensure compliance with the Ministry's availability norms.

[50]Ancillary equipment for handling dry bulk mainly comprising pay loaders, fork lift trucks, tractors, dozers, etc.
[51]Except Kandla, Tuticorin and Visakhapatnam.

However, utilisation of all equipment belonging to the ports was much below the minimum utilisation norms of 60 *per cent* prescribed by the Ministry.

During 2007-08, the utilization of 26 pieces of equipment at Cochin, Mormugao, New Mangalore and Visakhapatnam was less than 5 *per cent* despite the availability being above 80 *per cent*. In Chennai, two pay loaders were not used even once despite 52 *per cent*[52] availability.

Case Study: Crane utilisation at Chennai

Three 20-tonne gantry cranes were procured and commissioned by Chennai port at a cost of Rs 35.77 crore in 2000. Their utilisation declined steadily as shown below:-

Year	Percentage utilisation
2002-03	18.12
2003-04	4.61
2004-05	1.06
2005-06	0.72
2006-07	0.0

It was found that the users of the port were not willing to hire the cranes as the hiring charges levied by the port were high. The users, instead, preferred to hire private equipment having grabs of higher capacity. Apprehending a safety threat reported by the Inspectorate of Dock Safety, action for disposal of the entire lot was taken by the port in April 2007.The highest offer received was Rs.4.67 crore. The port approached the Ministry in November 2007 for writing off the eventual loss on disposal. Approval of the Ministry was awaited as of February 2009. While accepting the facts, the Management, stated (February 2009) that the primary cause of underutilisation was that the users had the option to use their own or private equipment and the cranes available with the port were unable to work with grabs of higher capacity as preferred by the users. It was further stated that reduction of hire charges below the ceiling rate approved by the Tariff Authority for Major Ports (TAMP) would have only drastically reduced the return on investment (ROI) made on acquisition of the cranes without improving the level of utilisation. The reply was not tenable as the ROI had become very low since 2003-04 due to poor utilisation.

At Haldia, which featured among the top five ports in terms of volume of dry bulk cargo handled, 11 pay loaders had suffered breakdowns and the users were hiring private equipment to carry out operations. The users of Visakhapatnam port indicated that low productivity of port equipment made cargo handling uneconomical. The demand for port equipment was low as they had outlived their economic life.

As port equipment was often unsuitable for meeting user requirements, users at all ports except Cochin, New Mangalore and Visakhapatnam were resorting to hiring of equipment directly from

[52] The availability of these two payloaders was much below the Ministry's norms due to frequent breakdowns.

private vendors. In Cochin, private equipment was not allowed in any of the docks and the users were thus compelled to use old and obsolete port equipment. In Mormugao and Kolkata, the users were hiring container handling equipment. No ports, however, maintained any systematic records relating to the extent of such hiring. The performance of port-owned equipment vis-à-vis private-supplied equipment could not be compared due to the absence of sufficient records.

Equipment maintenance

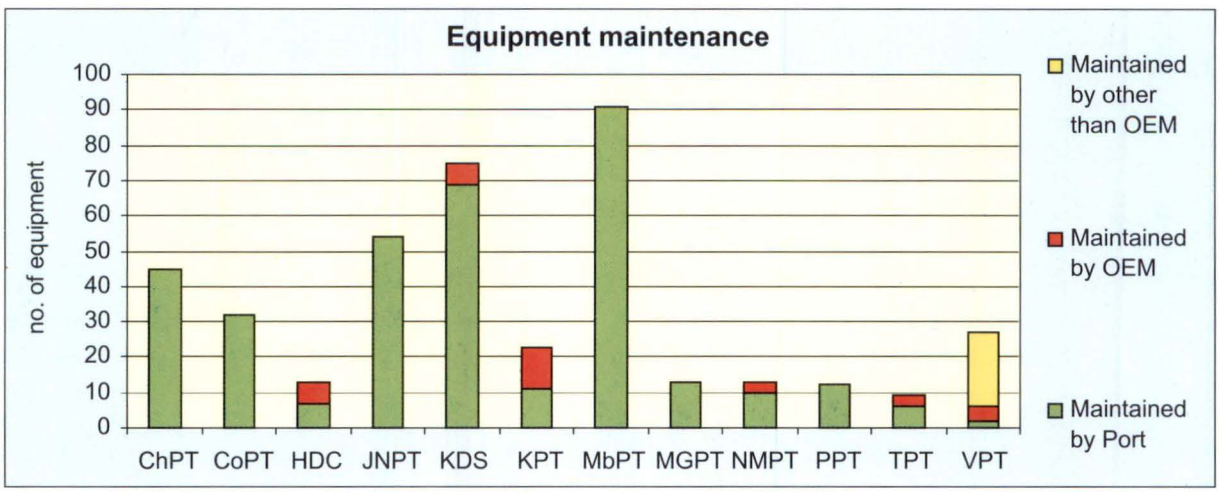


Fig 3.11

Although the demand for port-owned equipment was low and a large share of the fleet was beyond economic life, the ports were found to be incurring substantial expenditure on maintenance. The maintenance policies, however, varied from port to port. The entire fleet was being maintained internally at five ports (Fig 3.11). Only in Visakhapatnam, repairs and maintenance of 73.53 *per cent* of the equipment was outsourced. High-priced modern equipment like RMQC, RTYGC[53] were, however, being maintained by OEM[54] at all ports except JNPT, where equipment availability was more than 90 *per cent*. At Kolkata, which had the largest equipment fleet following Mumbai, with only 26 *per cent* utilisation, the expenditure on the maintenance setup per annum was highest at Rs 22.21 crore. In spite of this, the equipment availability at the port was the least (66.92 *per cent*) among the ports and was far below the minimum availability norms set by the Ministry. At Haldia, although the container traffic was low, the container handling cranes (RMQCs) maintained by OEM registered 32 *per cent* downtime during 2007-08 indicating improper maintenance.

[53]Rubber Tyred Yard Gantry Crane
[54]Original Equipment Manufacturers

3..4.4 Replacement of equipment

Replacement and procurement of new equipment was being done at all ports except Kandla where the port extended the life of nine outdated equipment by two years, leaving Rs.108.33 crore in the Replacement Fund unutilized till 2007-08. In order to synchronise the equipment support with the emerging cargo mix, it was imperative that the ports factored in their own business plans, their traffic projections and preferences of users of equipment. It was found that equipment replacement was being done mostly on immediate need basis and all the factors mentioned earlier were not being taken into consideration. Further, no port was found to have paid attention to the preferences of users regarding procurement or replacement of equipment during 2007-08. Procurement and replacement were not commensurate with the cargo mix handled by the ports, future diversification plans and user preferences as described in the examples given below:

- At Chennai, although the port planned to gradually phase out dry bulk cargo like coal and iron ore, it invested Rs.47.83 crore on installation and operation of a semi-mechanised coal handling plant in 2007. The Management stated (June 2009) that as coal handling was on the rise due to capacity constraints at Ennore, installation of the system had become necessary to control dust pollution. Moreover, due to overall recession in the shipping trade, shifting of coal elsewhere would have affected the port's revenue. The reply is not acceptable as the contention of the port is inconsistent with its long term vision. Further, the argument of recession is not valid as the investment was made in 2007 when maritime cargo in Chennai and in India overall, was witnessing high growth.

- Although dry bulk handling was significant at Haldia (Kolkata port), no dry bulk handling equipment had been procured for the port during the last five years. Instead, six container handling equipment were purchased at a cost of Rs. 71.19 crore, which remained underutilized as container cargo at Haldia remained low.

- At Visakhapatnam, the port did not have adequate equipment to effectively meet user requirements. There were demands from the users for better capacity equipment like mobile cranes of 150 tonne capacity, shore cranes of 40 tonnes capacity, etc which could not be provided by the port.

Further, the ports had reoriented their business models from 'service' port to the new 'landlord' port model under NMDP, framed in 2006. According to the 'landlord' model, a port focuses on trade facilitation by making investments on creation of common user facilities. Commercial operations like cargo handling are undertaken by private players who share revenue with the ports. Under this new model, although the ports were expected to move away from commercial operations like

cargo handling, it was noticed that 41 schemes for procurement and replacement of equipment valuing Rs 1622.67 crore were planned by the ports under NMDP (2005-06).

The Ministry, in its reply (August 2009), did not comment on the need to factor in user preferences, future diversification plans or the decisions to move away from the service model and its impact on equipment procurement. It simply stated that the ports had undertaken major capacity expansion plans that included modernization and addition of cargo handling equipment.

Recommendation

- *Concerted efforts should be made by the ports to phase out outlived equipment. Selection of equipment should reflect the port's business plan, trend and type of major cargo handled, and users' preferences.*

3.5 Labour Engagement

As cargo handling operations had been highly labour- intensive in the past, an assured supply of a large number of dock workers was necessary to provide competitive advantage to ports. In India, Dock Labour Boards (DLBs) had been set up at seven major ports, viz. Chennai, Cochin, Kandla, Kolkata, Mumbai, Mormugao and Visakhapatnam under the Dock Workers (Regulation of Employment) Act, 1948 for ensuring optimum labour utilization. This Act was amended in 1997 to merge the DLB pool with the port labour. This had been achieved in all ports except Kolkata.

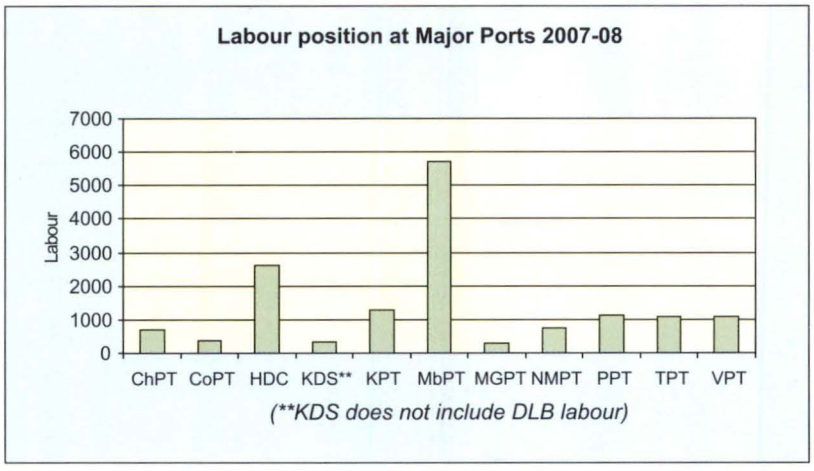


Fig 3.12

The process of handling, however, witnessed increased mechanisation as cargo packaging became more standardised. This led to a sharp fall in labour intensity of cargo transfer operations over the past decade, along with a rise in demand for new skills to operate the mechanised facilities.

Although the legislation governing DLBs was amended in 1997, leading to merger of the entities with the ports, old ports like Mumbai and Kolkata continued to remain heavily staffed organizations, resulting in high cost of services provided. The position of labour at the ports is shown in Figure

3.12. The overall staff positions at newer ports varied significantly with those of the old ports which were heavily staffed at all levels. The DLB at Kolkata continued to remain a separate entity.

3.5.1 Adequacy of labour supply

For ensuring effective and efficient cargo handling operations, it is necessary that the supply[55] of labour by ports is adequate. Audit observed that eight out of 11 ports, except Chennai, Paradip and Tuticorin reported shortfalls[56] in supply. The shortfalls at Kandla (25 *per cent*), Kolkata (30 *per cent*) and Visakhapatnam (59 *per cent*) were particularly high. In contrast, a surplus of 39 *per cent* was noticed at Paradip during 2007-08. The Chennai port business plan identified surplus labour as a weakness of the port. Mormugao was unable to supply enough workmen to operate a minimum of three hook[57] points at the berths. At Visakhapatnam, the shortfall was due to short supply of labour by the DLB. The users of the port indicated that the short supply of labour had seriously hampered onboard operations on many occasions. The users were, therefore, compelled to engage private labour.

The Ministry stated (August 2009) that the Visakhapatnam Dock Labour Board had been merged with the port and Visakhapatnam Port had also implemented the tribunal award on manning scales. This changed scenario could take care of the shortage of labour at Visakhapatnam.

3.5.2 Labour Productivity

To attain high operational efficiency in cargo handling, the ports should ensure that the available labour pool is properly trained, disciplined and productive. Further, the Ministry should also facilitate the laying down of proper standards for productivity assessment under the present equipment and handling conditions. Also, a standard format for reporting of productivity should be put in place to enable monitoring of performance.

The assessment of labour productivity at the ports was being made as per certain standards, viz. manning scales and datum. While manning scales determined the number of persons required for carrying out each type of activity, the datum determined the minimum output of labour per hook per shift, fixed on the basis of 80 *per cent* of the average tonnage handled during previous three years. For proper assessment, therefore, it was critical that the scales and the datum were reviewed and revised on a regular basis as new equipment and handling procedures were introduced in the ports.

[55] The ports supply labour to users on requisition. Deployment is made in terms of gangs for the number of hooks to be operated, and billing is done on the basis of period of engagement.
[56] Shortfall has been measured in terms of number of gangs supplied against number of requisitions.
[57] A location on the berth where cargo is transferred from the vessel by cranes/ grabs etc.

In this regard, Audit observed the following:

- The scales and datum at most of the ports had been fixed long back and had not been revised for more than 10 years.

- At Kolkata, an average of Rs 3.55 crore per annum was being paid on overtime allowances. Further, the ports were also incurring substantial expenditure on incentives to workers, as overall cargo volumes had shot up. For example, incentives were being paid in 2007-08 at Tuticorin under the piece rate incentive scheme, 1996 on the basis of datum fixed in 1998, although cargo volume had more than doubled at the port. Consequently, the users were also facing the high cost burden of port labour.

- At New Mangalore, the standards agreed upon in 1974 were being followed without revision, even though large scale mechanisation of handling facilities viz. conveyors, MHCs, etc had been made subsequently at the port. The norms were prescribed at Kandla in 1979, but no revision had been carried out so far. Due to such non-revision, the productivity assessment was distorted. As the manning scales were outdated, the deployment of persons for handling activities was higher, resulting in large overtime payments incurred by the ports.

- The business plan of New Mangalore port noted that the private sector was being forced to make use of the port's labour for cargo handling, which was more expensive. This was identified by its consultant as one of the main weaknesses of the port. The users of New Mangalore port felt that the manning scales for deployment and the datum required downward revision, which would reduce the cost of labour.

During the exit conference, the Ministry accepted (June 2009) the audit observation and stated that the matter of revision of manning scales had been referred to a National Tribunal. As per the recommendations received in 2006, orders were being issued in May 2009 for implementation. The Ministry accepted that with such implementation, the unjustifiable overtime payments would be significantly reduced.

The Ministry stated (August 2009) that the issue of standardization of manning scales and rates was referred to the National Industrial Tribunal in the year 2000, but the award could not be implemented due to a stay by Andhra Pradesh High Court. The stay was vacated in April 2009 and all ports were asked to implement the award. The Ministry felt that the implementation would bring uniformity and also bring down excess overtime payments. It was, however, seen that apart from Cochin, Mormugao, Paradip and Visakhapatnam ports, the other ports were yet to implement the award.

It was also noticed that the nature of reporting of productivity by ports was dissimilar and incorrect. The productivity was being reported in terms of gangs[58] or hooks. As composition of gangs and deployment per hook varied from port to port and also from cargo to cargo, inter-port comparison was difficult. It was further noticed that although the ports stated that they were not engaging any private labour, users at Chennai, NMPT, Tuticorin and Visakhapatnam clearly indicated that they had to engage private labour at additional cost, as the port labour was unproductive, inhibiting efficient handling. The extent of such handling done by private labour was neither being recorded nor segregated by the ports and the entire handling contribution was being attributed to port labour. Thus, the labour productivity reported by the ports to the Ministry was inflated and incorrect. While factoring in such distortions, inter-port comparison indicated that productivity at Cochin was very low. Business plan of Cochin port also identified this as a major weakness. Further, the labour rates at Cochin were substantially higher. The Management of Cochin Port accepted (May 2009) the observation and stated that steps to improve productivity through rationalization were being taken. They further offered to examine the reasons for variation in labour rates.

Reasons for low productivity of labour were mainly lack of training, aging labour force and indiscipline. Port users at Goa, Mumbai and Visakhapatnam stated that the available labour pool was unskilled and the skills of the labourers, especially those who handled steel and project cargo were inadequate. Hence, training was required for them. It was also noticed that the average age of the 5720 labourers at Mumbai was 51 years, which could have been a reason for low efficiency. Users also pointed out that labour indiscipline was inhibiting efficiency at Visakhapatnam. Effective work time in a day was only seven to eight hours there due to erratic punctuality, resulting in higher cost of operations. Visakhapatnam port, in its reply, stated (June 2009) that effective steps had been taken to improve punctuality of the labour. However, the Management also pointed out that delays in handling occurred as untrained hired labour was being engaged by the users in case of shortfall of port labour. At Cochin, the work was affected on 11 occasions in 2007-08 due to unrest by the port's own labour. On three occasions, the work down was extended up to 23 days, 17 days and 37 days, resulting in diversion of cargo. The port communicated to the Ministry that in addition to strikes called by the port's own employees, there were many instances of dislocation of work due to flash strikes, etc called by workers of different stakeholders like steamer agents, Customs agents, truck operators, etc. affecting productivity adversely.

[58] Deployment is made in terms of gangs for the number of hooks to be operated, and billing is done on the basis of period of engagement. Composition of a gang varies from nine to 17 workers.

Recommendations

- *For making correct assessment of labour productivity, ports should revise the manning scales and datum as recommended by the National Tribunal in 2006.*
- *The extent of engagement of private labour and their output should be recorded to distinguish their output from that of port labour, to avoid misreporting to the Ministry.*

3.6 Storage of Cargo

Availability of large storage areas at ports enables larger handling capacities and efficient accumulation of cargo. Moreover, ports earn significant revenue by leasing and renting out storage spaces.

3.6.1 Adequacy of storage area

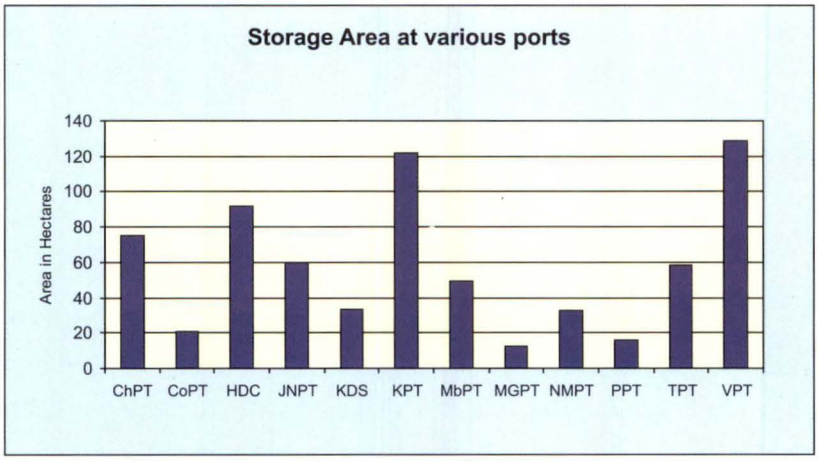


Fig 3.13

To ensure efficient landward transfer of cargo handled at the berths, it was necessary for the ports to have adequate storage areas. It was noticed that the storage areas available at ports, apart from Kandla and Visakhapatnam were less than 60 hectares[59] as shown in Fig 3.13.

Further, the scope of expanding the available storage areas also had its limitations. For example, at JNPT which faced shortage of space, further expansion possibility was limited as the process of land acquisition behind the terminal was fraught with rehabilitation risks.. Unlike international ports like Singapore, the major ports were generally not undertaking expansion by reclamation of land from the sea. Only at Tuticorin, the port had undertaken such reclamation.

[59]Against 60 hectares for three terminals at JNPT, the land availability for four container terminals at the Port of Singapore is 425 hectares.

Revenue earned from storage	
Port	Storage and demurrage receipts 2007-08 (Rs in crore)
ChPT	6.07
KPT	7.06
MbPT	76.97
NMPT	1.72
TPT	6.00
VPT	8.54

Table 3.6

It was also noticed that the revenue earned by the ports from storage operations varied widely as seen from Table 3.6[60].

In spite of having more space, Kandla and Visakhapatnam, which handled the highest volumes of cargo among major ports, earned low revenue from storage services. The business plan of Kandla port also identified sub-optimal utilisation of space around the port, as one of its major weaknesses. The users of most ports felt the availability of storage areas was inadequate.

Faced with scarcity of land for storage and limited scope for expansion, optimal utilisation of storage space was necessary to avoid congestion and to earn more revenue for the ports.

3.6.2 Undeveloped spaces/sheds hindered optimal utilization of storage area

At the ports, while some areas were earmarked for storage of containers and bulk cargo, most of the storage areas were for multipurpose use. Port users felt that the storage areas were of poor quality as detailed below:

- At Cochin, there was no exclusive storage area for foodgrains and other perishable cargo. Users complained about the poor maintenance of covered storage space resulting in deterioration in the quality of wheat stored and heavy losses. Sheds for storing cement were reportedly leaking.

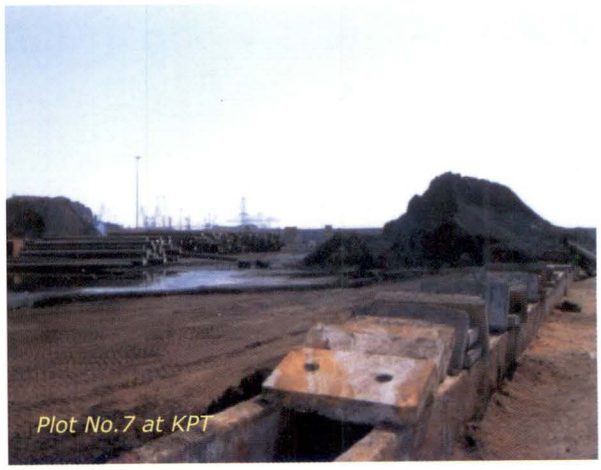
- In Kolkata, the areas available within the port premises were not developed and properly allocated for storage. Port users at Kolkata felt that the hardstands[61] and the storage areas were of poor quality and the lease rates sought for these marshy and unsuitable areas were relatively high. A number of godowns (at Garden Reach jetty) were presently filled with scrap and remained unused. The users felt that obsolete sheds and spaces at a number of locations (like Alifnagar and southern parts of Kidderpore and Netaji Subhash Docks) could be developed into proper storage areas.

- At Mumbai, there was a shortage of covered storage sheds. Consequently, roofless sheds were being allotted for foodgrains. Further, for automobile cargo, the parking area allotted was far away from the berth, causing inconvenience to users in loading, leading to higher TRT. The poor storage conditions also invited damage claims amounting to Rs 1.92 crore.

[60] At MGPT, storage and handling charges are collected together, and cannot be bifurcated.
[61] Built up spaces (concrete surfaces) used for storage.

At Kandla, a joint inspection carried out by Audit along with the port officials, revealed that there was no proper demarcation of plots, the storage areas were not clean and cargo was not being stacked properly as shown in Figure 4.2 that follows:.

Plot No. 1 at KPT



Plot No.7 at KPT

- Verification of records at Mattancherry and Ernakulam wharfs at Cochin for the period 2003-08 revealed that food items such as wheat, soybeans oil, copra cake, etc. were stored in the same shed where chemicals and minerals like calcium bauxite, industrial salt, sponge iron, murate of potash, coal, etc were stored.

- At Haldia, the users indicated that although sheds in the back-up area of Berth no. 9 had been allotted for storing food and agricultural products, these could not be utilised due to handling of iron ore at the berth. Therefore, the foodgrains had to be stored in other sheds.

- Apart from Mormugao and Mumbai, none of the ports had a laid down system for regular maintenance of storage areas. At Mormugao, temporary partitions were being used to segregate cargo. In Mumbai, the port had an annual budget of over Rs one crore whereas at Visakhapatnam, less than Rs 15 lakh per annum was incurred during the last three years for maintenance of the storage areas.

3.6.3 Storage policy and review of storage areas

At the ports, allotment of space inside the wharf areas was done by the Traffic Managers and outside these areas, by the Estate Officers of the concerned ports, based on the land policy guidelines issued by the Ministry in 2004.

As per the policy framed by the Ministry, the validity period for allotment of licences inside the port area was 11 months, with an option for renewal by paying five *per cent* escalation charges. Further, the licensees were required to follow all conditions stipulated in the Scale of Rates. Users

of the port at Kolkata felt that the quality of land allotted for storage was poor, compelling the licensees to make substantial investments in cleaning and construction of hardstands for making the areas suitable for storage.

Audit observed that as the validity period of the lease was only up to 11 months, it was a disincentive for making long-term investments and the 11-month ceiling on validity of lease was not in the interest of long -term users of the ports.

It was noticed that storage area plans were being reviewed annually in four ports, monthly at Visakhapatnam and as and when required in three other ports. At Kolkata, there was no system of regular review of storage area plan. At Chennai, it was found that the port had introduced a good practice, i.e if space licensed by a firm was not utilised and kept vacant for a period exceeding two months, the licence issued to it was to be terminated and the firm advised to surrender the space.

Recommendation

- *The 11-month ceiling on storage area licences may be modified in the interest of long-term users.*
- *The Chennai model of storage area review may be adopted at other ports.*

3.7 Cargo Handling and Environment

As handling of liquid bulk (POL, chemicals, etc) and dry bulk (coal, iron ore) carry significant environment pollution risks, it was necessary that the ports ensured compliance with extant regulations and implemented good practices to mitigate them. The issues relating to the environmental risks noticed during audit are described in the succeeding paragraphs.

3.7.1 Precautions for handling oil cargo

To prevent and minimise risks to marine environment posed by the handling of POL[62] cargo, vessels handled at berths should be surrounded by oil booms[63], so as to restrict the spillage of oil.

Further, the Central Pollution Control Board (CPCB) regulations stipulate that ports should install oil sensors, oil spill response equipment, fire sensors, etc, and also periodically report compliance to the Pollution Control Boards.

[62] Petroleum Oil and Lubricants

[63] Protective floating barriers that surround the ship to restrict the impact of spillage of oil.

Oil vessel being handled without using oil booms at KDS

Greasy oil jetty at KDS

Audit observed that at Mumbai port, one of the highest POL cargo handlers in India, marine pollution equipment procured at Rs. 2.63 crore between 1991 and 1995 was not being utilised properly due to the absence of trained staff and proper maintenance. Non- removal of old pipelines also constituted safety hazards. At Tuticorin, there was no oil spill response equipment. Unlike JNPT which had scuppers[64] at the jetty. no such structures were found installed at Kolkata, although significant oil handling was occurring at jetties (at Budge Budge) outside the dock systems. In the absence of these, the oil jetties and installations at Kolkata remained greasy. There was no ballast[65] facility at the berths at Cochin.

Good practices in India:

In Visakhapatnam, oil booms were being placed on all sides of liquid bulk vessels to suck spilled oil. Fire watches were also being placed near the vessels. User charges were being levied for such services. Such booms were also being used at Chennai where an oil recovery vessel was also available. At New Mangalore, de-ballasting facilities were provided for tankers in its premises to avoid pollution. The port was also recovering cleaning charges from users.

3.7.2 Precautions for handling dry bulk

To mitigate the impact of dust, air and noise pollution due to handling of dry bulk, CPCB stipulated that ports should restrict the heights of iron ore and coal stacks; surround them with wind-screens; load vehicles carrying such dry bulk cargo up to the brim and cover them with tarpaulin; install sensors for automatic water sprinkling at dust generating locations and install anemometers[66] to

[64]Openings in side walls allowing draining out of liquids.
[65]Water filled devices used on ships for stability. To avoid marine pollution by introduction of invasive species during ballast discharge from tankers, specific facilities need to be created.
[66]Devices for measuring wind speed.

carry out ambient air quality measurements. Ports were also required to report periodically on a number of air quality parameters to respective State Pollution Control Boards and ensure that air quality indicators like suspended particulate matter (SPM), etc were within prescribed limits.

Audit observed the following:

- The business plan of Chennai identified exposure to dust-filled environment as a serious weakness of the port. A large number of measures had been taken in Chennai to restrict such pollution and independent monitoring was being done by Richardson & Crudass Ltd, a Government of India undertaking.

- At Haldia, although sprinklers and tarpaulin covers were in use, wind protection screens around coal stacks were not found to be in use. Users at New Mangalore indicated high levels of pollution at bulk handling berths like ore and coal berths.

- At Mumbai, the Pollution Control Cell was inadequately manned, there was poor maintenance of pollution control equipment and the air quality was not being adequately monitored.

- Proper procedures were also being followed at major bulk handling ports like Mormugao and Paradip.

- At New Mangalore, the port engaged an independent agency, viz. the National Institute of Technology, Karnataka (NITK), Suratkal for monitoring environmental parameters including ambient air quality on monthly basis. Although the port put in place all the requisite measures, the NITK reports revealed high dust pollution within the port premises in two out of the three months surveyed by them. Critical parameters like SPM and RPM were beyond tolerance limits.

- At Visakhapatnam, the port had introduced some good practices like usage of leak proof grabs, deployment of leak proof dumpers for transportation, etc.

Recommendations

- *Ports should consistently deploy oil booms and other protective measures while handling POL cargo to restrict the impact of oil spillage. Oil sensors to detect spillage of oil in the water front and oil-water separators, skimmers, dispersant spray systems etc. should be used to remove pollutants from water bodies as per international best practices.*

- *Ports should make provisions for levying fines on tankers/vessels polluting harbour waters and berths and recover the cost of consumables used for cleaning operations of oil spillages from the users.*

3.8 Handling and Documentation

In order to ensure minimum idle time of vessels and post-handling detention at berths, it was necessary that the information interfaces between the port, the Customs authorities and the users were efficient. The users of most of the ports mentioned that there were delays due to cargo clearance formalities both at Customs and clearance points at the ports. Users at Cochin mentioned that over 35 sheets had to be filled in for clearances from the Customs and port authorities.

Although all the ports had LAN based information systems and displayed multiple information on their websites, none of the websites had the status of clearances of bills or other information like berthing schedules, etc which were of immediate use to the users. At Mormugao, information on status of refunds being processed by the port was not available to the users. It was noticed in Tuticorin that online procedures did not reduce the burden of manual procedures. Import/export applications, after being filed electronically, had to be also produced physically for processing, defeating the very purpose of e-filing/booking. At Visakhapatnam, erroneous bills were being generated from the online system and the same had to be subsequently corrected manually. Similarly, in spite of having e-booking facilities for berths, users could not get reservations for the berths at once, unlike leading ports in China, Singapore etc. Moreover, ports did not have fixed time limits for processing information requests online. At Paradip, for example, out of eight information requests received online in July and December 2007, two had not been addressed till December 2008, indicating slow response. The port users at Kolkata indicated the need for a friendly information interface between port users, Customs and the ports.

Problems noticed at Visakhapatnam are presented in the box below:

IT interface at Visakhapatnam Port Trust: A system study

At Visakhapatnam, computerization began in 2002. However, several processes remained dependent on earlier manual data generation. The vessel-related inputs for the berthing programme meetings (where agents met the Traffic Manager's staff to decide the day's berthing, unberthing, shifting movements) were not generated through the Visakhapatnam Port Operation and Management System (VPOMS) application. Daily reports like shed position, ore berth position, etc were also not being generated. Berth information was noted in manual registers and conveyed to the control room over phones for data entry into the computerised system, indicating time lags and duplication. Video-conferencing systems supplied to the Traffic Manager and Dock Managers had not been put to use so far. Six levels for approving the bills extant in the manual system continued even after computerization, indicating no business process reengineering. As all the information was not being captured at source, certain bills continued to be generated manually. Problems were also faced in generation of lease bills in the case of new agents who did not have deposit accounts. The processes generated dissatisfaction among users. Agents complained that services were not provided on Saturdays after 12 noon due to server shutdowns.

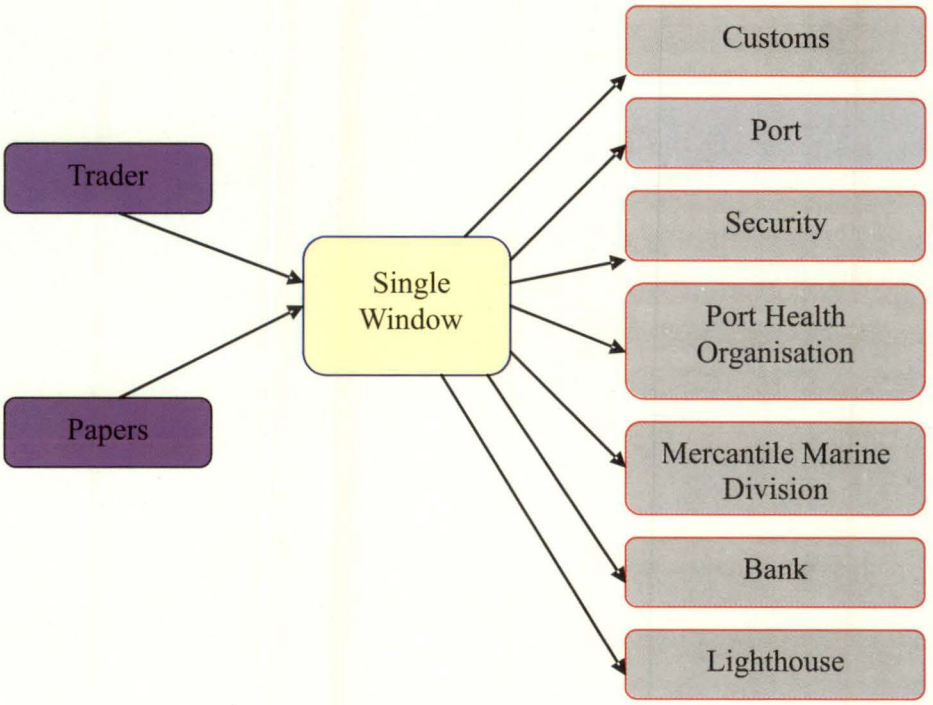
At JNPT, although high operational efficiency in handling was noted, the users, in the absence of a single window system, were required to file papers at different locations, viz. the Marine Department, Operations Department, the Cash Section under the Finance Department as well as at the gate. These points were dispersed, causing delays in transmission of papers and information. An EDI system linking the port, Customs and the container freight stations at the port was still to be fully implemented. Port users felt that Customs clearance was a big hurdle and stated that in spite of computerization, hard copies of documents were being insisted upon. Although information on location of containers at the yard was available online to users and agents due to the implementation of a container tracking system, the users felt the need for more accuracy in the system. They also pointed out that the private container terminals provided quick and accurate responses queries made on their websites. Such procedures made identification of cargo and doing business easier.

The Inter-Ministerial Group constituted by the Committee on Infrastructure had identified information technology (IT) as a strategic tool that would eliminate 23 person-to-person interfaces and 50 minutes in pre-arrival documentation besides 23 hours in import and 15 hours in export documentation. Towards this objective, the Ministry was funding the development of a Port Community System (PCS) for all ports through the Indian Port Association (IPA) complying with the uniform forms as per UN EDIFACT[67] standards. The PCS would enable ordering of berth and pilot services, smooth documentation, acceptance of digitally signed documents, enquiry and tracking, linkage to port authorities and existing port user systems and billing. It was noticed that the PCS was not fully functional till December 2008, in spite of the targeted completion time of December 2007. Moreover, the linkages to the ports and the existing systems of the ports appeared remote in light of the fact that each port had developed its system independently without integration as an objective. For example, the IT systems of Kolkata Dock System and Haldia Dock Complex under the same port authority still remained to be integrated in spite of computerisation plans under implementation since the last 10 years.

[67] United Nations/Electronic Data Interchange for Administration, Commerce, and Transport

Best Practices in documentation:

The Port of Singapore provides a single window environment to users as shown below:



- A user at Singapore files a single document online which is communicated to statutory bodies online for approvals, thus reducing the TRT and labour costs.

- *Port of Rotterdam.com*, launched in December 2000, is one of the most cited instances of how best a port authority can make use of the Internet medium to cater to the diversified needs of various players in a port community. The Rotterdam port's Internet platform consists of a main website with five sub-portals; a news site, a job site, a business index, a database with sailing times and information about the Port of Rotterdam Authority. Additional thematic sub-portals are being planned as more port-related companies develop online applications for their businesses. In addition to the thematic sub-portals, many categories will give access to relevant websites. The site is in many ways, a microcosm of the port itself. Rotterdam is a hub where flows of various goods converge. Cargo such as oil, ore and coal, fruit and dry goods are handled by specialised companies, which are located in designated areas of the port. The online portal reflects this multi-operation/ multi-location character of the port. Various information flows are managed by external business partners but converge in one centrally coordinated site.

- Mundra Port in India has a clear berthing policy displayed on the webpage of its website

The Ministry, in its reply, stated (August 2009) that the ports had been directed to computerise their activities. They assured that the time taken in documentation would be significantly reduced once the PCS system was properly implemented. They also pointed out that the users needed to be properly involved for the new system to be effective.

Recommendation

- To reduce delays in documentation, the ports should strive to achieve single window clearance systems and implement the Port Community System effectively.

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.

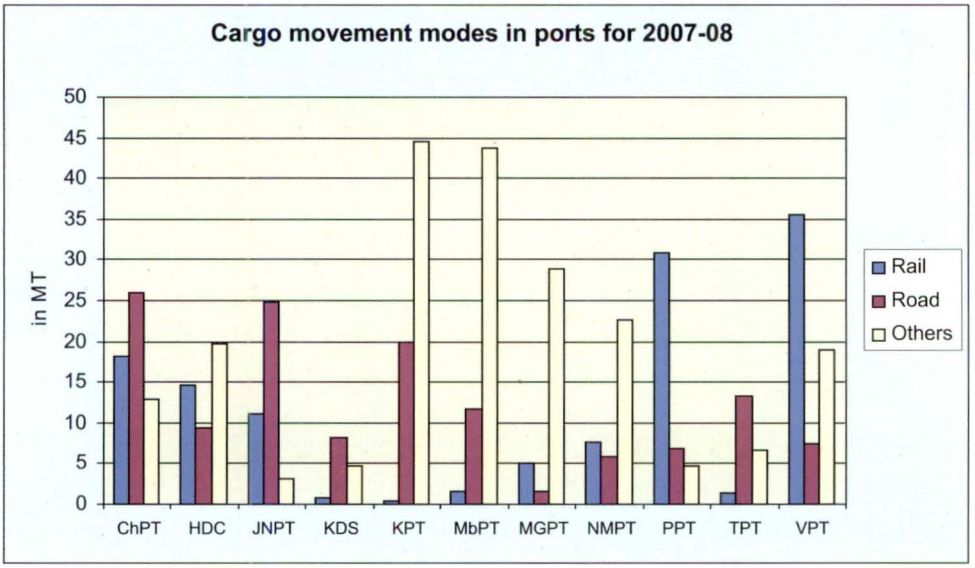


Fig 4.1

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.

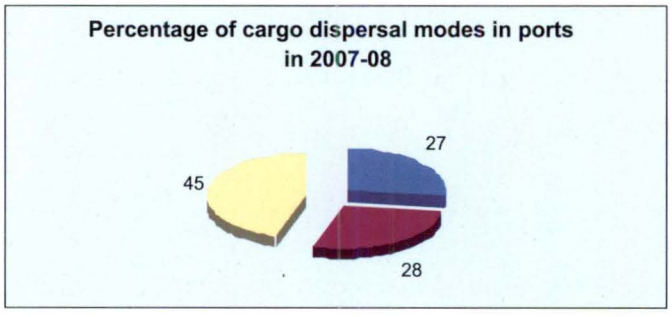


Fig 4.2

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.

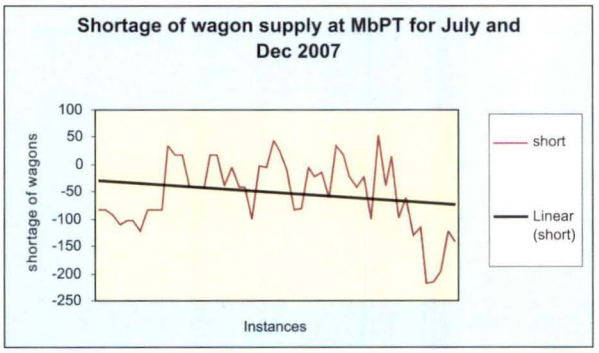


Fig 4.3

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.

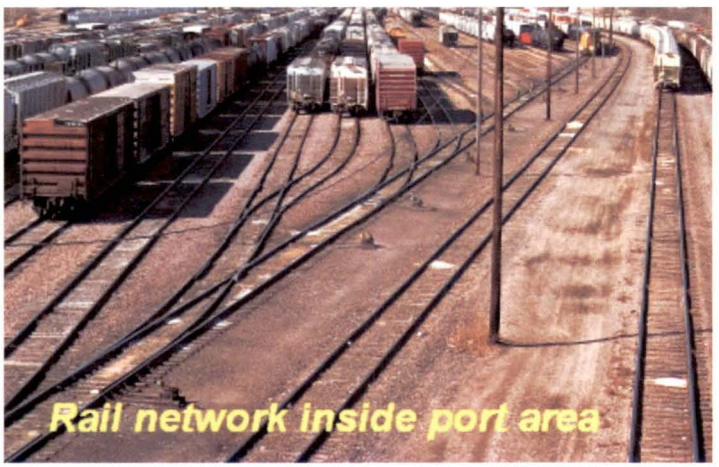
The high density Eastern and Western rail corridors in India were saturated in terms of line capacity and utilisation. To overcome some of these issues, the Committee on Infrastructure approved (February 2006) the constitution of a Task Force to prepare a concept paper on dedicated freight corridor projects. 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.


Rail network inside port area

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

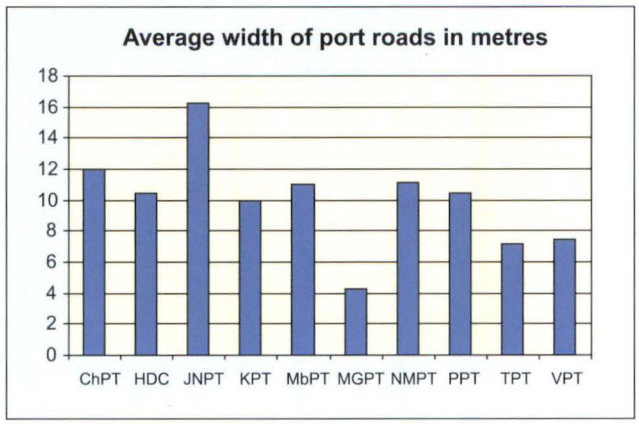


Fig 4.4

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.*

5 Performance indicators

5.1 Performance Indicators of Ports

Operational efficiency at ports is determined primarily by the following four efficiency parameters:

Efficiency parameters

- **Output per ship berthday**: The average output of a ship at a berth per day measured in tonnes of cargo.
- **Idle time at berth**: The time when a vessel remains idle at berth expressed as a percentage of the total time of the vessel at berth. Lower idle time would mean early completion of cargo handling and readiness for more vessels.
- **Pre-berthing detention:** The time during which a ship waits before getting entry into a berth. (as explained in footnote no.7)
- **Turn-round time:** Total time spent by a ship since its entry till its departure. (as explained in footnote no 8)

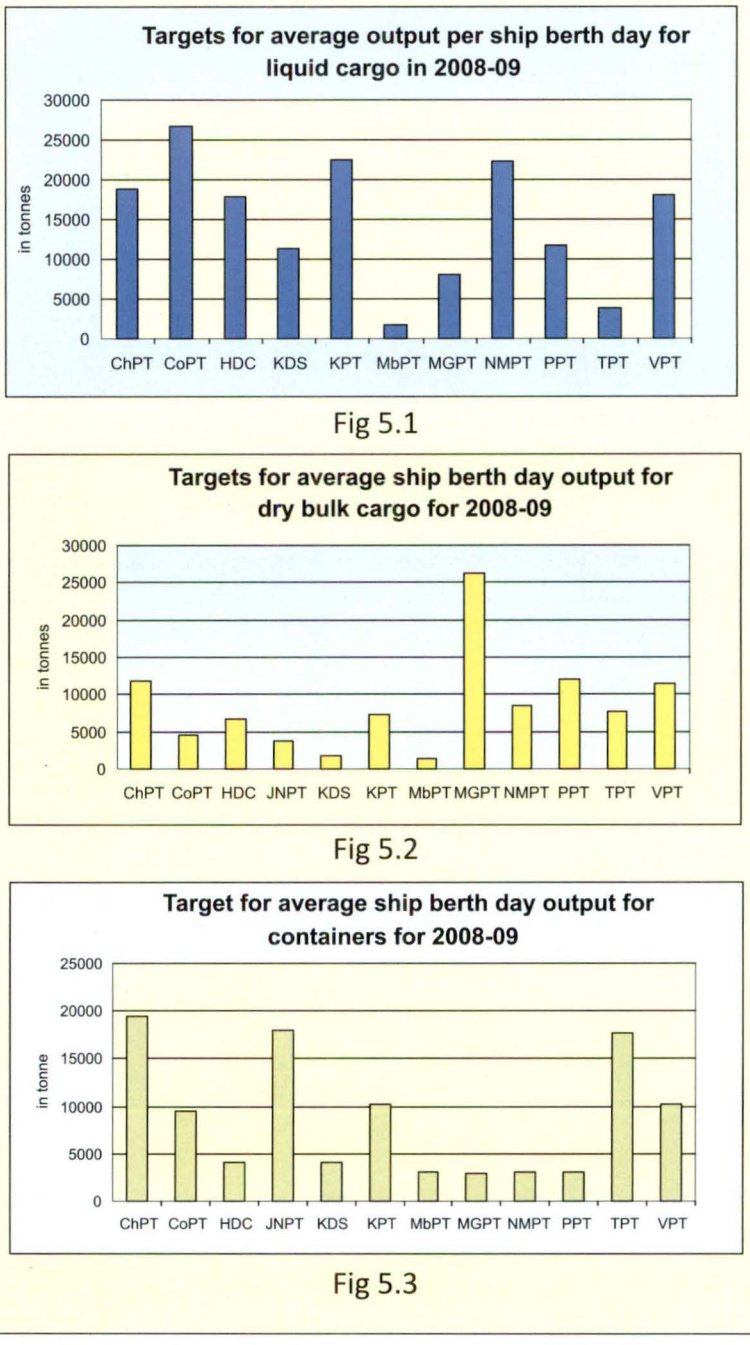
Every year, each major port enters into a MoU with the Ministry, in which targeted efficiency parameters are agreed upon. The efficiency parameters for a year are fixed, taking into account a percentage increase over the average of the last three years and the traffic projections as communicated by the Ministry of Shipping. The Ministry had stipulated (April 2003) that these targets should not be lower than the actuals for the previous year. As the performance of a port in respect of the above parameters enhances its competitiveness, it is imperative that the targets are fixed in a manner that incentivises better performance.

5.2 Fixation of Targets

Audit observed significant deficiencies in the formulation and fixation of performance targets as discussed in the succeeding paragraphs.

5.2.1 Wide variations in targets

There were significant inter-port variations in respect of targeted efficiency parameters which were abnormally low in some cases. The variation in targets for output per ship berth day in 2008-09 in different ports for different categories of cargo, are shown in Figures 5.1, 5.2 and 5.3.



It can be seen that the targets for output per berth day at Tuticorin and Mormugao were very low compared to those of Cochin and Kandla in the case of liquid cargo. Similarly, for dry bulk cargo, the targets were low for Kolkata and Mumbai as compared to Mormugao and Paradip. Container targets were highest in Chennai, JNPT and Tuticorin.

Since the targets fixed by the Ministry were not based on the standard outputs of equipment and berths and remained a mere upgrade of the previous performances as already stated in Para 5.1, very low targets were set in some ports based on past achievements, which did not motivate them to achieve higher mechanisation levels and adopt better labour practices.

5.2.2 Formulation of high idle time

Audit observed that in seven out of the 11 ports, the Ministry had fixed idle time targets of more than 20 *per cent* of the time at berth as shown in Figure 5.4. At Haldia, the vessels were targeted to be idle at berths for 42 *per cent* of the time. As a result, vessels remained at berths for longer periods, resulting in increased waiting time for incoming vessels and congestion. It was noticed that despite having mechanised facilities for handling dry bulk cargo, the average PBD for a dry bulk vessel at Haldia was 4.24 days, out of which 2.21 days were on account of berths remaining occupied.

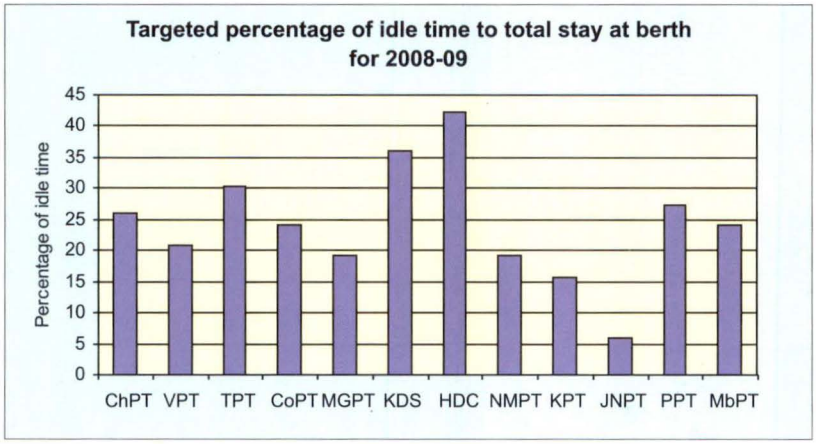


Fig 5.4

In the case of Mumbai port, the idle time at berths targeted continuously for the last three years was 25 *per cent*. The port Management stated (May 2009) that the high idle time was due to the long time taken for documentation and clearances, constituting 60 *per cent* of the idle time. Since the targets were based on past achievements, the idle time incurred for documentation was also factored into the targets. This indicated that the targets fixed by the Ministry were not realistic.

5.2.3 Low equipment utilisation target

Although the Ministry fixed norms of 90 *per cent* availability and 60 *per cent* utilisation for all equipment, these were adopted only by JNPT. In Mormugao and Kolkata, no specific targets for utilisation of equipment were prescribed in the MoUs. At all other ports, the targets for utilisation mentioned in the MoUs were below the prescribed norms for some of the categories of equipment. At Cochin and New Mangalore ports, the utilisation targets for wharf cranes were below 10 *per cent*. Mumbai port consistently adopted abnormally low targets for utilisation of equipment for the last three years as shown in Table 5.1.

Utilisation targets for Mumbai port (percentage)			
Type of equipment	2005-06	2006-07	2007-08
Wharf crane	17	17	17
Fork lift	20	20	18
Heavy duty fork lift	15	10	15
Quay gantry cranes	25	20	15
RTG crane	5	Not fixed	Not fixed
Reach stacker	10	10	Not fixed
Mobile crane	12	12	12

Table 5.1

The Ministry validated these low targets in the MoUs in disregard of the norms it had prescribed earlier. The low and easily achievable targets did not motivate the ports to adopt good practices like synchronization of maintenance schedules, proper inventory management and timely cargo aggregation for improving the utilisation of equipment.

5.2.4 Reduction in targets

In contravention of the Ministry's stipulation (April 2003) against lowering performance targets, several ports reduced the targets in their MoUs (Table 5.2).

Efficiency parameters	Instances where targets were lowered
Average ship berth day output	Target lowered in the case of VPT for liquid and JNPT for dry and break bulk cargo
Idle time at berth	Target lowered for JNPT
Pre-berthing detention	Target lowered for HDC, JNPT, NMPT and VPT
Turn-round time	Target lowered for Haldia and JNPT and VPT

Table 5.2

By validating the reduced targets, the Ministry's stipulation for non-reduction of performance targets was rendered largely ineffective.

5.2.5 Targets not based on facts

The performance parameters were not based on standard equipment or output of berths due to which there was no proper interrelationship between the parameters.

Audit observed the following in this regard:

- At Kolkata port, a two *per cent* increase in output per ship berth day was targeted to handle six *per cent* increase of cargo volumes, indicating a mismatch between the two.

- High availability levels of equipment presuppose proper maintenance arrangements like annual maintenance contracts, periodic overhauling and manning of in-house workshops, in the case of old ports. The cost of maintaining high availability levels of equipment is realised only if they are matched with proper utilisation. It was noticed in audit that the targeted availability of forklift trucks in Cochin was raised from 75 to 85 *per cent* in the targets set for 2008-09, whereas the target for utilisation was reduced from 50 to 29 *per cent*. Similarly, in the case of wharf cranes, the availability for 2008-09 was targeted at 90 *per cent* whereas the

utilisation target was reduced from nine to seven *per cent* at Cochin. At New Mangalore the targets for such cranes came down from seven to five *per cent* during 2006-08. Increasing the availability targets without increasing the scope of utilisation would have enhanced the maintenance costs without any added benefits.

5.3 Recording and Reporting of Performance

As per the international norms, TRT of a vessel is calculated from the time of arrival till its departure. It is expressed in days or hours. A diagrammatic representation of PBD and TRT is shown in Figure 5.5.

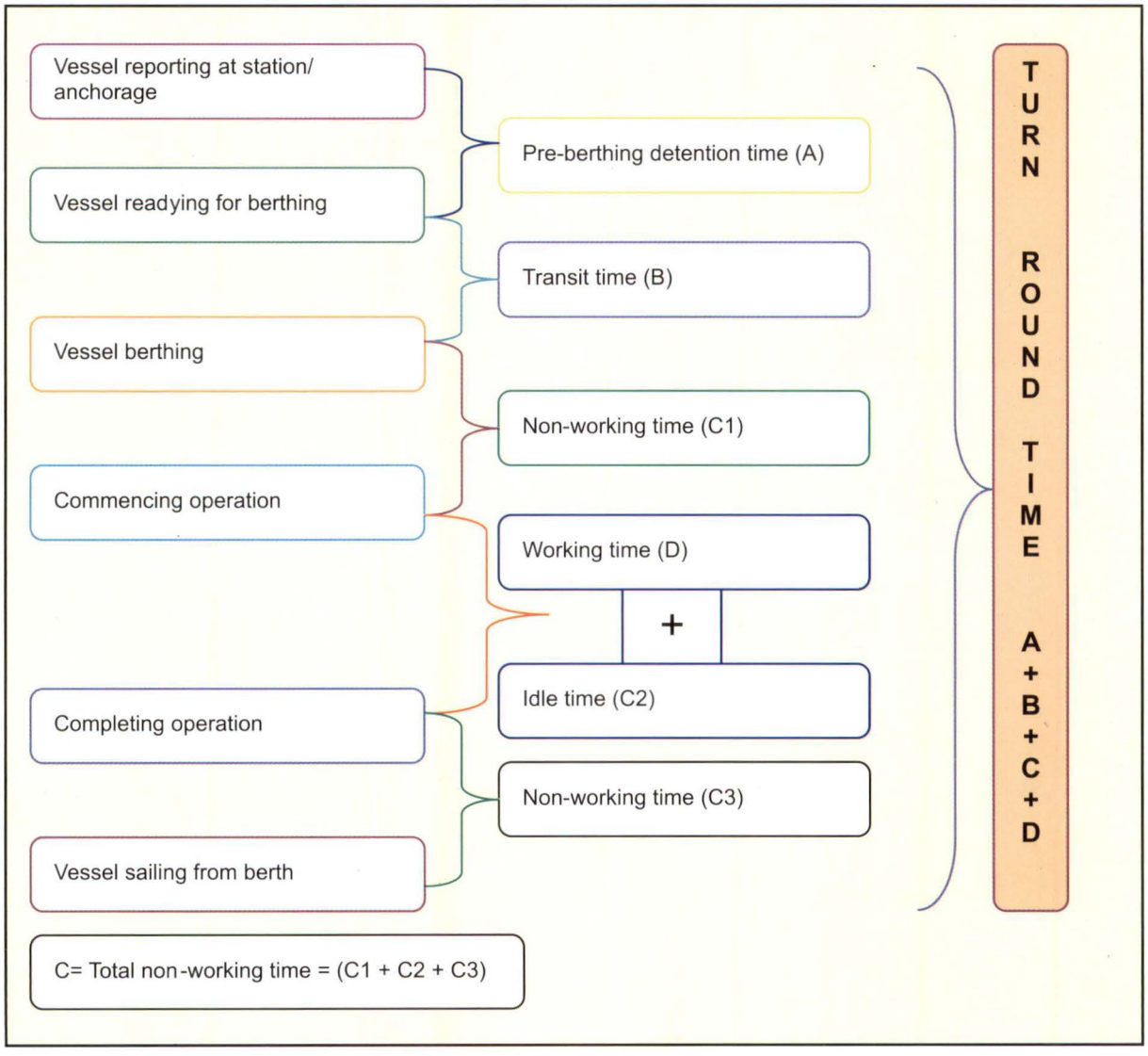


Fig 5.5 Diagrammatic representation of PBD and TRT

As shown in the diagram, the total TRT also includes PBD. In 2002, the Ministry instructed the ports to report TRT from the time when a vessel was ready for berthing till the time it left the berth and to exclude the waiting period on non-port account.

Similarly, PBD was to be reckoned from the time of arrival of a vessel at anchorage till the time of its readiness for berthing as shown above. The Indian Ports Association (IPA), an autonomous body under the Ministry of Shipping, communicated (July 2006) to all the ports, the need for segregating the factors affecting PBD into 'port account' and 'non-port account'. Factors such as requirement of berths, pilots etc, which were directly under the control of the port, were to be classified to be under 'port account' and factors like ship breakdown, weather constraints etc were to be clubbed under 'non-port account'.

In this regard, Audit observed the following;

- Chennai port reported average PBD of 0.96 hours per vessel in their Administrative Report for 2007-08, which represented the PBD only on 'port account' whereas the average PBD was 37.37 hours if delays on 'non-port account' were also included in the calculation. The other ports however, disclosed the total PBD in their reports.

- At Cochin, PBD due to non-availability of berths was recorded as PBD on 'port account' and all other factors for delays from the time of arrival of the vessels at the anchorage point up to the berthing time were classified under 'non-port account'. Even though the port accepted (May 2009) that the movement of hazardous cargo vessels was restricted during night hours due to poor lighting in the Mattancherry channel, no PBD on account of night navigation was recorded under 'port account'. After including 4646 hours of PBD, which was not classified, under 'port account', the PBD worked out to 7.65 hours as against 1.21 hours per vessel reported by the port for 2007-08.

- At JNPT, the vessel data in the Vessel Register of the Operations Department did not match the entries in the reports prepared by the Marine Department. It was noticed that the time of boarding of a vessel by a pilot was in some cases shown to be prior to the time of arrival of the vessel at anchorage. The entries in pilots' diaries showed that one pilot had handled more than two arriving vessels at the same time and one pilot had handled two vessels- one incoming vessel from anchorage to berth side and another outgoing vessel sailing from berth at the same time, which was not possible. Such inconsistencies in reporting of data were also noticed in the software used by the

port. The software for recording the vessel data required dates to be reported as MM/DD/YYYY, whereas sometimes dates were reported as DD/MM/YYYY, leaving scope for incorrect computation of PBD and TRT.

- JNPT computed the PBD of vessels by ignoring the period from the arrival of a ship at anchorage to the boarding of the pilots. This was not as per the IPA code and the actual PBD was, therefore, much higher than the reported one. The total PBD in respect of 1725 vessels that called at the port during 2007-08 was 39,947 hours. Against an average PBD of 4.22 hours and 2.17 hours computed by the port for two months viz; July and December 2007 respectively, the average PBD actually worked out to 9.18 hours and 7.40 hours as computed from the records of the Dock Master/ Berthing Assistant.

- The PBD at Kandla was computed taking into account the dates and timings of arrival of vessels at the outer berth till the dates and timings of boarding of the pilots on the vessels. At Kandla, if a vessel was anchored at the mooring before final berthing due to any other reason, the waiting time in the mooring was also added to the PBD.

- Tuticorin port had two operational wings, viz Zone A and Zone B. Though the cargo handled at Zone B was included in the total cargo handling of the port, the performance indicators of Zone B were not included in their Administration Report. The port's Management replied (April 2009) that these indicators were not being maintained as Zone B handled small vessels/ barges only. Reply of the Management is not acceptable as there is no such evaluation by the Ministry for preparation of performance indicators. In the absence of this information, the reports did not reflect the complete picture of the performance of all the berths of the port.

As calculations of PBD and TRT were reckoned from the time when vessels were ready for berthing, the readiness was interpreted differently by different ports considering factors such as the time when the pilots boarded the vessels, pilot call time and starting time towards the berth, resulting in lack of uniform reporting of TRT amongst the ports. The method of computation of TRT also differed from international practices of computing TRT adopted by the United Nations Conference for Trade and Development (UNCTAD).

5.4 Achievement of PBD and TRT targets

Apart from the deficiencies in target fixation discussed above, most of the ports failed to achieve the efficiency targets for PBD and TRT as shown in Figures 5.6 and 5.7.

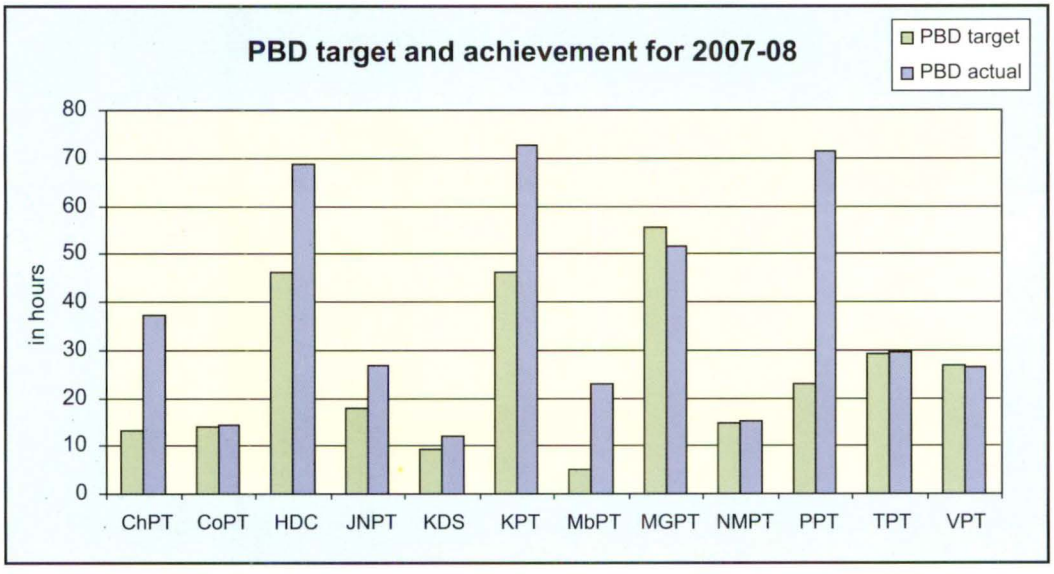


Fig 5.6

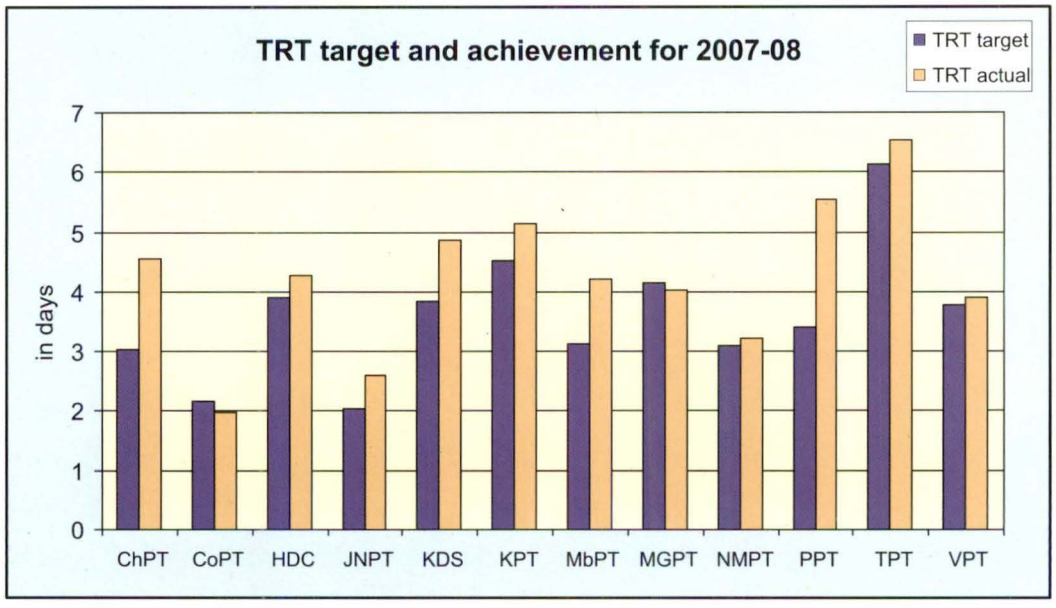


Fig 5.7

At Visakhapatnam, the TRT targets could not be achieved as dry bulk constituting 64 *per cent* of the total cargo was mostly handled by conventional means instead of through

mechanised facilities, consuming more time than required. Analysis of data on post-handling detention time for vessels at NMPT during 2007-08, revealed that 696 vessels were detained for more than three hours on an average beyond the normal time of two hours prescribed by the port. Such post-handling delays were mainly attributable to documentation and draft problems.

The average TRT at Berth No-9 having a Mechanical Ore Handling Plant, the most preferred berth at MGPT, was 5.93 days in 2007-08 against 5.76 days in 2006-07. Lower output during the year coupled with shortage of preferred berths caused the increase in TRT of the vessels.

Audit observed that the TRT for 2007-08 (Table 5.3) at the port's own container terminal in JNPT was almost double the TRT of private operators, indicating higher efficiency of private terminals. This enabled the private terminals to handle more vessels than JNPCT.

JNPT Berth	Number of vessels	TRT in days reported by Port
JNPCT	664	2.27
NSICT	722	1.04
GTIPL	941	1.48

Table 5.3

At Haldia, it was noticed that in the cases of 72 vessels, an average of 25 hours per vessel was lost due to idle time at berth and post-handling detentions during December 2007.

At Kandla, the high occupancy of berths was due to the vessels not leaving the berths after completion of handling. It was also noticed that in 114 cases during 2006-07, ships were detained after the completion of cargo handling for 11 to 24 hours against the average post-cargo handling detention of five to six hours at the port. This also led to idle occupancy of berths and increase in TRT.

At Mumbai, TRT was 2.91 days, mainly caused by the time lost at the berths. Out of 1.08 lakh hours spent at berths, 0.17 lakh hours were idle mainly on account of documentation problem.

5.5 Berth Occupancy

The berth occupancy factor (BOF) is the time that a berth is utilised, divided by the total available time. For a port, it is the primary indicator of congestion. As recommended in the Major Ports Development Plan by the Port of Rotterdam, 60-70 *per cent* would be the optimum BOF while higher berth occupancy would indicate congestion.

The parameter is defined as a percentage of the time when a berth is occupied to the total time

Berth no (NMPT)	No. of vessels handled in July and December 2007	Occupancy Percentage
10	28	71
7	9	60

Table 5.4

available at the berth. BOF is an important consideration for making investment decisions for addition of new berths or extension of existing ones. It was, therefore, important that the correct position of berth occupancy be presented to the Management and investors.

It was noticed in audit that the ports[84] were computing and reporting BOF in terms of the days when the berths were occupied during a year. Even when a berth was occupied for an hour during the day, occupancy for the whole day was reported. This resulted in reporting of high berth occupancy even when only a few vessels were being handled.

At New Mangalore Port Trust, berths handling fewer vessels also reported high occupancy as shown in Table 5.4 due to lower capacity of MLA's and non-mechanisation of berths. Similarly, at Visakhapatnam, Berth No EQ 2 reported 80 *per cent* occupancy, whereas it handled only 0.61 million tonnes of cargo during the year. At JNPT, during 2007-08, the berth occupancy reported was in the range of 54.71 to 84.55 *per cent,* whereas the berth occupancy calculated by Audit ranged from 31.38 to 83.65 *per cent* as shown in Table 5.5.

Type of berth	Occupancy reported by the Port	Occupancy calculated by Audit
JNPCT	84.55	79.66
GTICT	71.69	59.30
Shallow Water Berth	54.71	31.38
BPCL	60.29	59.55

Table 5.5

Calculation of berth occupancy in days did not give a correct position of congestion at the berths and also posed a risk in taking decisions regarding new berths, as cited in the following case study.

[84] NMPT however stated in June 2009 that they were computing and reporting BOF on hourly basis.

Case Study: Berth Occupancy at Cochin and Investment Decisions

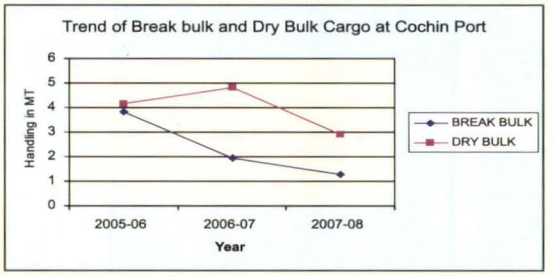
The port calculated berth occupancy by taking the occupancy for a day even when the berth was occupied just for a few hours during the day. Under this method, the berth occupancy was high despite the berths being vacant most of the time. Even though the port was operating at 56 *per cent* of its capacity, the berth occupancy figures at Cochin ranged between 60 and 72 *per cent*. It was seen that the occupancy of the berths would be lower, if calculated in hours, as shown below. The capital expenditure decisions for berth reconstruction and widening taken to address the high occupancy of berths are also shown below:

Occupancy in hours			
Berth no	**Type of Cargo**	**Occupancy reported in days (*per cent*)**	**Berth occupancy based on hours (*per cent*)**
Q1	General cargo	100	16.50
Q3	General cargo	75	35.30
Q6	General cargo/ containers	67	54.63
Q7	Containers	30	26.30
Q8 & Q9	Containers	42	41.25
NCB & SCB	General cargo/Liquid Ammonia	59	44.90
Average		66	50.00

Capital expenditure decisions			
Sl. No	**Name of the work**	**Board sanction**	**Tendered cost (Rs in crore)**
1.	Widening of BTP	30.1.2006	3.85
2.	Reconstruction and revamping of NCB (for handling coal)	15.10.2007	19.88
3.	Re-constructions of Mattancherry /wharf (Q4 berth) (for handling dry bcarbulk (c) cargo)	31.10.2006	45.22

As seen from the table, the BOF fell sharply when it was computed in hours. Audit observed that in light of the low occupancy figures computed in hours and poor utilisation of capacity (56 per cent in 2007-08), the capital expenditure decision to reconstruct Mattancherry wharf (Q4 berth) needed reconsideration. In addition, the project also merits reconsideration in view of the following factors:

(i) The consultant reported that the trend of the cargo was decreasing as shown in the figure below



(ii) The wharf (Q4 berth) was being designed to accommodate vessels with draft of 12.5m. The average depth of Mattancherry Channel was only 8.10 m and it would require more capital investment for extensive capital dredging;

(iii) Due to prevalent height restrictions by the adjacent naval base, two cranes of 25 tonne capacity each, could not be installed. Thus, operation of the berth remained a remote possibility.

The Management stated (May 2009) that the investments for creation of capacity were capital-intensive with a long- term life span and it may not be appropriate to limit the scope of future growth in view of constraints that were short-term in nature. The port ought to have considered factors such as availability of Ernakulam wharf with 12.5 m draft for handling bulk cargo, naval restrictions on the height of cranes and the possibility of higher utilisation of other berths, before going in for investment of Rs 45 crore on Mattancherry wharf.

The Ministry accepted (August 2009) the audit recommendations.

5.6 Port Capacity

In respect of major ports, the capacities of the port are the aggregated capacities of all their berths as computed below:

Capacity	=	330 x berth occupancy x achievable ship berth day output	
	(=330 =	No. of working days in a year)	
Berth Occupancy	=	I **Specialised terminals**	
		a One berth	60 %
		b More than one berth	70 %
		II **General cargo berths**	
		a Upto three berths	70 %
		b More than three berths	75 %
Achievable Ship Berth Day Output	=	Volume of cargo handled in that berth in a year/ berth utilisation in a year	
		○ In the case of existing berths, the maximum output achieved during the past few years may be taken	
		○ In the case of new berths, average ship berth day output may be taken, considering parameters like type of cargo, method of handling, vessel characteristics and equipment productivity.	

Audit observed the following;

- As per para 7.1.2 of the recommendation of the IMG in July 2007, ports were to ensure round-the-clock operations by December 2008. By taking the working days in a year as 330, the calculation of capacity was conservative by 10 *per cent*.
- Berth occupancy was not computed properly in the ports as stated in Para 5.5 and further assessments based on such figures only distorted the capacity position.
- The capacity of berths did not represent the handling of cargo that was possible at a berth but was merely an extension of what happened in the previous years. This is explained by means of an illustration as shown subsequently:

Example:
Total cargo handled during a year =**600** tonnes
Berth occupied in days =200 days
Capacity (taking 365 days)=(**Average output per day)** X (**Berth Occupancy)** X 365
= (**600**/200) X (200/365) X 365
= **600** tonnes

Thus the capacity calculated by the ports was equal to the cargo actually handled and had no relation to the size of berth, draft, other infrastructure facilities. As a result, the inefficiencies of the past years were being factored into the subsequent years due to which most of the ports were reporting high capacity utilisation.

Case Study: Ad hoc capacity calculations

(i) **Capacity at Kolkata Dock System (KDS) (calculation as on 31 March, 2007)**

- For calculating the capacity at KDS, the actual ship berth day output was not taken but some projected figures were taken which were up to 85 *per cent* more than the actual. The increment in output considered for calculating capacity was not realistic when the equipment and all other factors remained the same.
- Berth occupancy was taken as 75 *per cent* for all the berths even though the highest occupancy was 63 *per cent* and 21 berths had occupancy of 27 *per cent* or less with the least being 7 *per cent*.
- KDS adopted 330 days for calculation of capacity against 365 days as envisaged in the port's policy,

(ii) **Capacity at Cochin (calculations as on 31 March, 2008)**

- Instead of the actuals, projected figures were taken for outputs, which were not linked to equipment or other facilities at berths.

Berth No	Actual berth day output	Berth day output taken for capacity calculation
Q2	413	1500
Q3	562	1500
NCB	3899	3000
SCB	5412	3000
COT	27052	10100
NTB	9730	8000
STB	8389	8000
Q7	7541	6000
Q8	9562	6300
Q9	8152	6300

- The capacity arrived at as per the calculation was 22.87 million tonnes as on March 2008 but the figure of reassessed capacity was finally stated as 28.37 million tones, indicating an addition of 5.5 MT. The reasons for addition of capacity were not available on record.

The Ministry stated (August 2009) that the capacity of the ports was assessed by the Engineering Wing of the Ministry after objective assessment of the infrastructure like jetties and equipment. The reply is not acceptable as it was found that the capacity calculations were based on past performances and objective assessment on the basis of available infrastructure was not being made.

5.7 Capacity Augmentation Schemes

Audit examination revealed that high capacity utilisation and berth occupancy were considered to be important parameters to justify expansion and addition of berths as well as other facilities by the ports. Inaccurate assessment of these parameters entailed the risk of creation of surplus capacity as discussed below:

- At Cochin, the capacity of the port as on March 2008 was 28.37 million tonnes. The actual cargo handled during the year was, however 15.76 million tonnes at 56 *per cent* of the capacity. Against this background, NMDP envisaged further capacity augmentation to 33.50 million tonnes at the end of Phase-I i.e. by 2008-09. As the capacity was already understated by factoring inefficiencies in the capacity calculations, the capital expenditure decisions taken by the port were not justified.

- In New Mangalore, four out of 13 berths had capacity utilisation of less than 50 *per cent*. Lack of facilities at the berths resulted in non-uniform utilisation of berths. It was also noticed that after creation of the facilities, the capacities remained unutilized. The capacity of New Mangalore as of March 2005 was 30.30 million tonnes which increased by 4.5 million tonnes during 2006-07 with the construction of an additional general cargo berth. The re-assessed capacity of the port as of March 2008 was 43.50 million tonnes. This capacity remained unutilised as shown in Fig. 5.8.

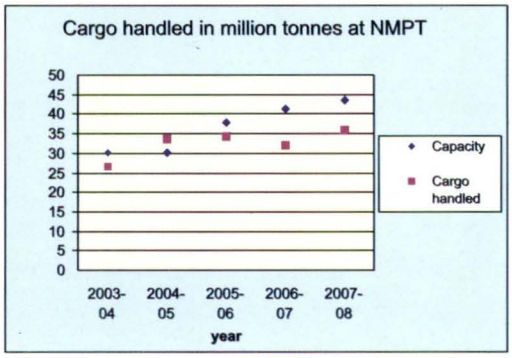


Fig 5.8

Recommendations

- *All major ports should adhere to the defined common minimum standards of performance based on the output of standard equipment under normal working conditions, without making allowances for inefficiencies.*
- *In the case of equipment, the ports should adopt measures like prioritization and synchronization of maintenance schedules, proper inventory management, timely cargo aggregation and disposal of obsolete/surplus equipment without undue delays in achieving better availability and utilisation, rather than lowering the targets to indicate achievements.*

- *The Ministry should ensure correct reporting of pre-berthing detention and turn-round time by the ports.*
- *The Ministry should consider computation of berth occupancy in hours, Capital expenditure decisions on new berths should be based on occupancy and utilisation figures of existing berths in hours.*
- *Capacity should be objectively assessed, based on the capacities of equipment and other infrastructure facilities and should not merely reflect the handling done during the earlier years.*

The Ministry stated (August 2009) that the cargo handled differed across ports and the equipment and infrastructure were not standardised.

The argument cannot be accepted as except for some types of cargo like logs or machinery for projects, most Indian ports were essentially handling similar cargo such as iron ore, coal, crude oil, POL, fertilizers and containers, although the cargo mix varied from port to port. Audit compared the targeted efficiency parameters for different types of cargo across ports (Figs 5.1, 5.2, 5.3) and found that the targeted outputs varied widely for similar cargo. For example, in the case of the most standard cargo i.e containers, the average output per day varied widely from 2500 TEUs per day to 18000 TEUs per day. Further, for each category of equipment, there needed to be a standard level of output on the basis of which, the efficiency targets for berths should have been fixed. Consequently, low targets in some ports did not motivate them to achieve higher standards of performance. Moreover, as explained in the foregoing paragraphs, efficiency enhancements could not be achieved by allowing targeted idle time at berth of over 20 *per cent* in seven of the 11 ports (Para 5.2.2) and equipment utilization target of less than 20 *per cent* (Para 5.2.3).

In light of the above, instead of fixing targets based on past performances, there was a need for defining standards across ports based on objective parameters like standard output of equipment and labour, so that reasonable and comparable standards of efficiency could be achieved at all ports.

The Ministry further stated (August 2009) that efficiency parameters like PBD and TRT were being monitored both by the Ministry and the IPA. In this regard, Audit noticed that details of the factors causing PBD and TRT at ports as required by IPA and the Ministry were not being maintained and reported uniformly by the ports. The Ministry's contention that the ports were maintaining the records of time taken for each activity from the vessel arrival at anchorage was, therefore, not acceptable.

6 Schemes undertaken

6.1 National Maritime Development Programme

Government of India had formulated the National Maritime Development Programme (NMDP) in 2006 to facilitate enhanced private investment, improve service quality and promote competitiveness amongst the ports. A total of 276 schemes and projects, involving investment of Rs 55804 crore[85] up to 2011-12 were identified under the NMDP to realise the stated objectives. The programme was the first national level Plan for the sector and sought to integrate all major schemes under implementation in the major ports as on 2005-06. It also underscored a policy shift for the business model to be followed by the ports from a 'service model' to a 'landlord model', as explained in Fig 6.1 below:

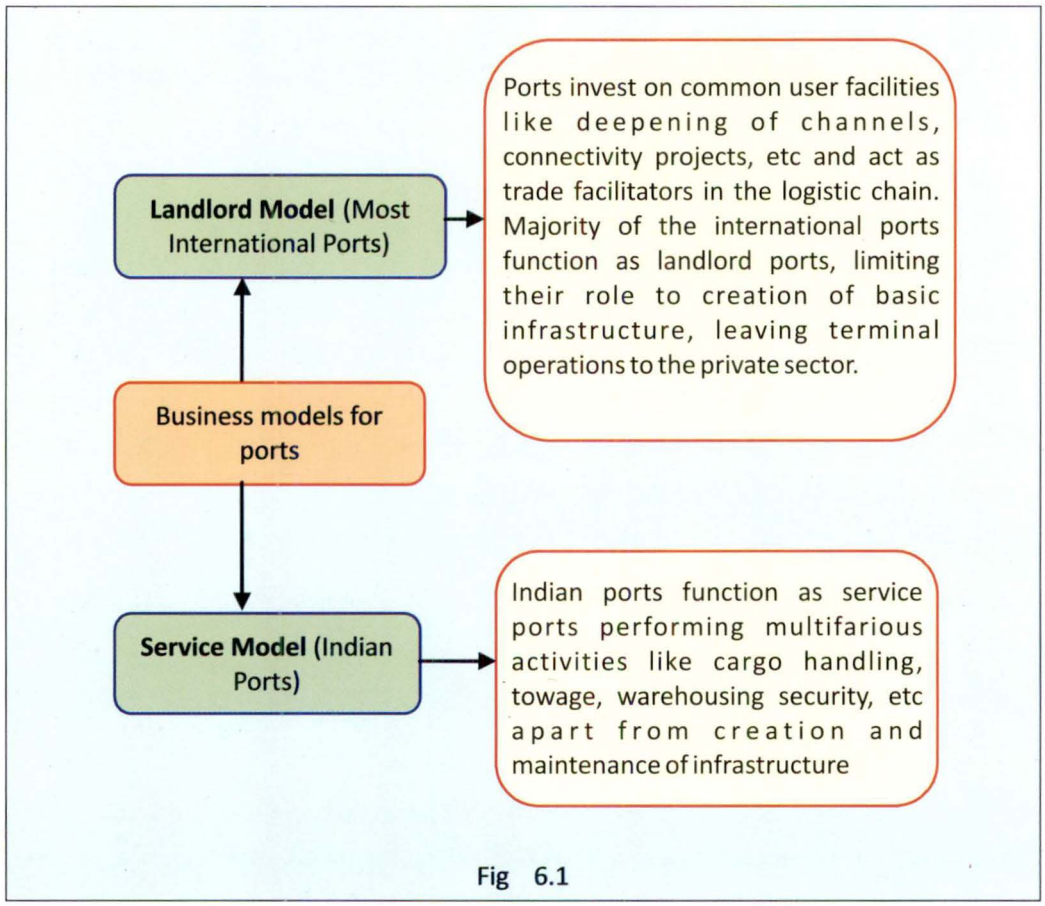


Fig 6.1

The term 'landlord model' had developed gradually in the literature on port development. The advantages cited for adoption of this model for ports included availability of customer-tailored

[85]This included 14 schemes of Ennore Port involving an investment of Rs 6466 crore.

services, inflow of expertise and technology, increased responsiveness to market demands and curbs on cross- subsidization and segmentation of tariff.

NMDP envisaged enhancement of the handling capacity of the major ports from 385 MT in 2004-05 to 755 MT by 2011- 2012, in two phases (2005-09 and 2007-12) as given in Table 6.1 below:

NMDP	No of schemes	Total investment (Rs in crore)	Private funding (Rs in crore)	Share of private funds (in % terms)	Expected capacity rise (in MT)
*Phase-I (05-09)	170	27075	14562	54	230.40
*Phase-II (07-12)	92	22263	14194	64	139.27
Total	262	49338	28756	58	369.67

**Excepting schemes planned for Ennore Port*

Table 6.1

The schemes under NMDP focus on the following major areas (Fig 6.2):

- Deepening of channels/ berths
- Berth construction
- Procurement of equipment,
- Connectivity projects,
- Others.

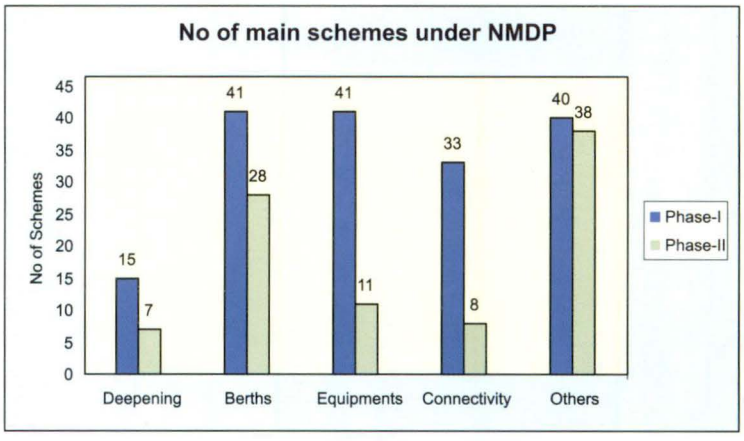


Fig 6.2

In line with the landlord model, the bulk of the public investment was planned to be made on development of common facilities through schemes on deepening and connectivity. Fifty four *per cent* of the investment was planned for construction, upgradation and reconstruction of berths, where private players were expected to play a dominant role under private-public partnership (PPP). It was expected that by the end of Phase-I i.e. by March 2009, an additional capacity of 230 MT would be created[86] to take the total handling capacity in major ports to 616 MT.

[86] Another 139.27 MT of capacity was expected to be added upon completion of Phase-II of NMDP by the end of Phase-II i.e March 2012.

6.2 Status of Implementation

It was observed that only 31 out of 170 schemes constituting only 18 *per cent* of the total schemes envisaged under Phase I of NMDP were completed (Fig 6.3) by March 2009. These were mostly schemes relating to replacement of equipment where the average value of investment was below Rs 50 crore and was within the sanctioning power of the port trust boards.

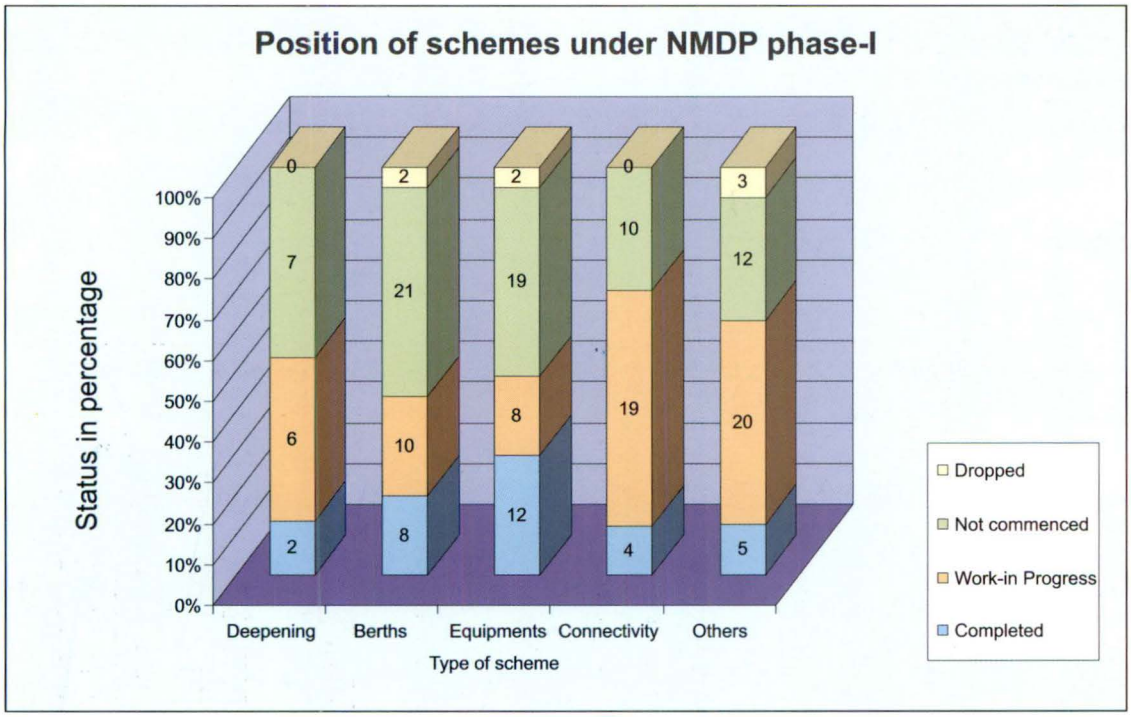


Fig 6.3

The progress of implementation of schemes relating to deepening of channels and construction of berths was dismal. In spite of this, the ports reported (March 2009) a handling capacity addition of 184.57 MT in four years from March 2005 to March 2009, which was 80 *per cent* of that targeted in Phase-I of NMDP.

6.2.1 Delays in execution

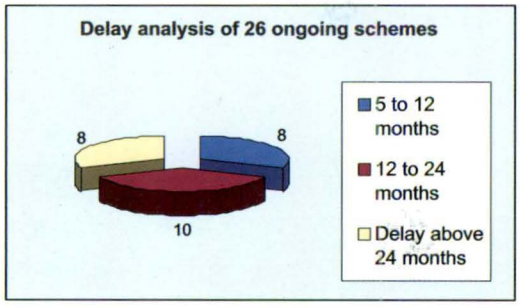


Fig 6.4

An analysis of 26 ongoing schemes (see Fig 6.4) indicated that these schemes were behind schedule during December 2008. Delays in completion of the projects were attributable to factors like delays in approvals of the Ministry, delays in clearances from the Ministry of Environment and Forests (MoEF) and State Pollution Control Boards and delays in tendering and contract procedures.

JNPT had planned 27 schemes (the highest among all ports) to be taken up by March 2009. Out of these, only 11 schemes had been taken up and only five could be completed.

At Mumbai, the NMDP schemes planned for development of berths (through PPP or public investment) could not take off due to reasons shown in the following box:

Berth construction/ upgradation schemes in Mumbai: Rs 1577 crore

i) "Construction of second berth for handling chemicals off Pir Pau pier" (Rs 90 crore with investment from port's and State Government's funds). The aim was to reduce high PBD at the existing chemical berth at New Pir Pau. The construction was still to commence even after 10 years from the original sanction date.

Project	Original sanction date for development by private funds	Cancellation of original tender	Sanction date for development by internal resources	Date of seeking Ministry's approval	Date of sanction by Ministry	Date of cancellation of new tender.	Date of re tendering	Status as of December 2008
Second-chemical berth	November 1999	September 2002	July 2005	April 2006	November 2007	March 2008	October 2008	Tenders pending finalisation
Delays	-	-	33 months	8 months	18 mths	-	6 months	

ii) "Construction of two offshore container terminals (Rs 1228 crore)" through PPP mode. Works were still to commence after 10 years since conception.

Project	Master Plan sanction date	Preparation of detailed feasi-bility report	Target date of commissioning	Delay in invitation and processing of Request for Qualification (RFQ)	Delay in grant of security clearance by Ministry for opening RFPs	Time taken for finalisation of draft licence agreement	Time taken by Ministry to grant approval to port's component of work (about 35%)	Status as of December 2008
Offshore container terminal	January 1999	December 2001	March 2005	36 months	20 months	30 months	15 months	Licence agreement signed in December 2007.

iii) "Reconstruction of quay wall to avoid damage to Hay Bunder": Although construction work was taken up, the contractor abandoned the job after physical progress of 4 *per cent.*

Project	Date of issue of three tenders that were cancelled	Date Cancel-lation of third tender	Final work award Through 4th ten-der	Target date of com-pletion	Date of abandon-ment of work by contractor	Date of approval -termina-tion of contract by port	Physical progress of work	Audit obser-vation
Quay wall	July 2001 July 2003 May 2005	July 2006	Sept 2006	Janu-ary2008	October 2007	October 2008	Four per cent	Inad-equate monitor-ing of the emergency job by the port.

Audit also observed the following deficiencies in other ports:

- Chennai port had planned a total investment of Rs 1597 crore on 10 schemes, targeting a 76 *per cent* addition to its existing capacity of handling 41.2 MT as on March 2005. It was found that none of the projects could be completed within the schedule and the capacity reported by the port at the end of 2007-08 was only 53.35 MT.

- For Mormugao, nine schemes with a total estimate of Rs 573 crore were included in NMDP for capacity addition of 13 MT. Out of these, as of October 2008, only one equipment replacement scheme, involving an expenditure of Rs 33 crore, had been completed. Three critical schemes planned with private investment of Rs 302 crore had not been initiated as of March 2009.

- New Mangalore port planned 14 projects for Phase-I with an investment of Rs 4240 crore including private funding of Rs 3145 crore on eight schemes. It was noticed that till March 2009, two projects involving Rs 190 crore from private funds were in progress and one scheme was dropped. However, five projects involving Rs 2830 crore of private funds were still to be taken up. Out of those, two schemes involving Rs 50 crore private investments were awaiting Government approval.

- The capacity increase envisaged for Tuticorin port during Phase-I of NMDP was 2.25 times of its existing capacity of 15.8 MT in March 2005. Towards this end, 17 schemes were planned for the port. It was noticed that due to delays and non-completion of most of the projects, the port's handling capacity stood at only 20.75 MT, registering a rise of only 25 *per cent* against the ambitious target.

- Visakhapatnam port targeted a capacity addition of 50 *per cent* against its existing capacity of 49.65 MT, with the implementation of 22 schemes under NMDP. Being a port which

handled significant volumes of dry bulk cargo, successful implementation of the schemes on modernization of handling equipment formed a critical prerequisite for its capacity augmentation. It was found that out of five schemes for procurement of equipment under Phase-I, only two could be completed. Out of five railway connectivity schemes envisaged at Visakhapatnam, none could be completed.

The status of schemes planned under Phase-I of NMDP is enclosed in the ***Annexure*** to the report.

6.2.2 Prioritisation among schemes

NMDP acknowledged the limitations of drafts at Indian ports. However, it was observed that only 11 *per cent* of the funds amounting to Rs 2878 crore were envisaged for 15 deepening projects planned in the first phase (Table 6.2).

Status of all major deepening schemes taken up under NMDP phase-I (Rs in crore)					
Port (No of Schemes)	**Investment planned**	**Budgetary support**	**Port's Internal resources**	**Progress**	**Remarks**
Chennai (1)	143	48	47	68 *per cent* completed	Project cost to be met completely from internal resources.
Cochin (2)	412	189	223	One completed	One scheme of Rs 33 crore completed. 36 *per cent* of the other one completed till 31 March 2009. Government sanctioned Rs 83.93 crore loans for the scheme.
JNPT (1)	800	nil	800	No work	Ministry did not approve the tendered value (being 25% above estimates).
Kandla (1)	136	68	68	In progress	Work-in-progress as on March 2009.
KoPT (1)	385	385	nil	No work	Ministry directed to get the scheme revalidated. Due to delay the revised estimates have crossed Rs 900 crore.
MGPT (1)	65	32	33	No work	Not yet taken up.
NMPT (2)	20	nil	20	One completed	The other scheme is in progress.
Paradip (2)	194.84	143.23	51.61	work in progress	One scheme is in progress.
TPT (1)	450	225	225	No work	Tender under process.
Vizag (3)	273	103	135	One work in progress	Dredging in progress under one scheme. Second scheme at tender stage. Third is to be taken up.

Table 6.2

All the major deepening schemes except the one at JNPT were planned to be executed with budgetary support from the Government to the extent of 34-100 *per cent* as seen from Table 6.2.

Audit observed that none of the critical deepening schemes, planned at seven ports, could be completed during the Phase-I period of the NMDP. The problems were attributed either to decision delays at various stages or non-finalization of tenders. However, the fact that not even a single major scheme had been completed indicated that adequate priority had not been accorded to this category of projects. The situation was similar for connectivity projects[87] where one out of the 11 rail projects, and only three out of 22 road projects could be completed. Problems were attributed to delays in approvals and slow progress on behalf of partner agencies like Railways, NHAI, State governments, etc.

Since deepening schemes aimed at creation and upgradation of common user facilities which were the primary responsibility of ports under the landlord model, non-implementation of these indicated a lackadaisical approach towards the National Maritime Development Policy. The biggest challenge of draft adequacy was not addressed while other related schemes were taken up. For example, at Haldia, where draft availability was the biggest threat and inefficient lock gate operations restricted entry to only eight vessels on an average per day, schemes for addition of berths were taken up without addressing these vital issues. Lack of proper emphasis on deepening schemes resulted in shortfalls in achievement of targeted capacity[88].

The Ministry stated (August 2009) that an Apex committee and an operational committee with representatives of all concerned had been formed for better coordination in the case of connectivity projects.

6.2.3 Non-alignment with the National Plans

Since NMDP had been formulated by taking into account important parameters like vessel sizes, economic growth, national traffic demand and other national projections, taking up of schemes

[87]Implementation delays in connectivity projects and reasons have been discussed in the chapter on port connectivity (Chapter 4).

[88]Targeted capacity: In spite of slow progress on the schemes that were planned, the actual capacity of major ports reported by the Ministry at the end of 2008-09 was 570.07 MT. The reported capacity addition during Phase-I of NMDP was 184.57 MT against the target of 230.40 MT, indicating 80 *per cent* achievement of the target. However, as the actual capacity calculated by ports was based on actual handling that was done and not on any scientific basis depending on the types of berths, types of equipment support, sizes of vessels, etc the actual target achievement in capacity augmentation could have been much lower. The problems inherent in the capacity calculations made by the ports have been separately commented upon in the Chapter on 'Performance indicators'.

by ports other than those envisaged under NMDP, posed a risk of allocation of resources towards projects in a suboptimal manner, in deviation of the national Plan.

It was, however, noticed that the ports were implementing important schemes which were not covered under NMDP as shown in Table 6.3 below:

Ports	No of non-NMDP schemes	Important non-NMDP schemes
KPT	4	Capital dredging at B7-B10- Rs 6 cr Procurement of 3 MHCs-Rs 38.44 cr Improvement of facilities-Rs 20 cr Barge jetty at old Kandla-Rs 10 cr
MbPT	1	Replacement of 4 pilot launches- Rs 19.88 cr
TPT	5	Sethusamudram project-Rs 2233 cr Cargo berth construction-Rs 40 cr Procurement of 3 MVA Captive Power Plant-Rs10 cr
VPT	11	Replacement of dredger-Rs 30.90 cr Replacement of tug-Rs 18.80 cr Berth construction- Rs 34.04 cr Construction of berths on BOT basis Crane procurement-Rs 32.64 cr

Table 6.3

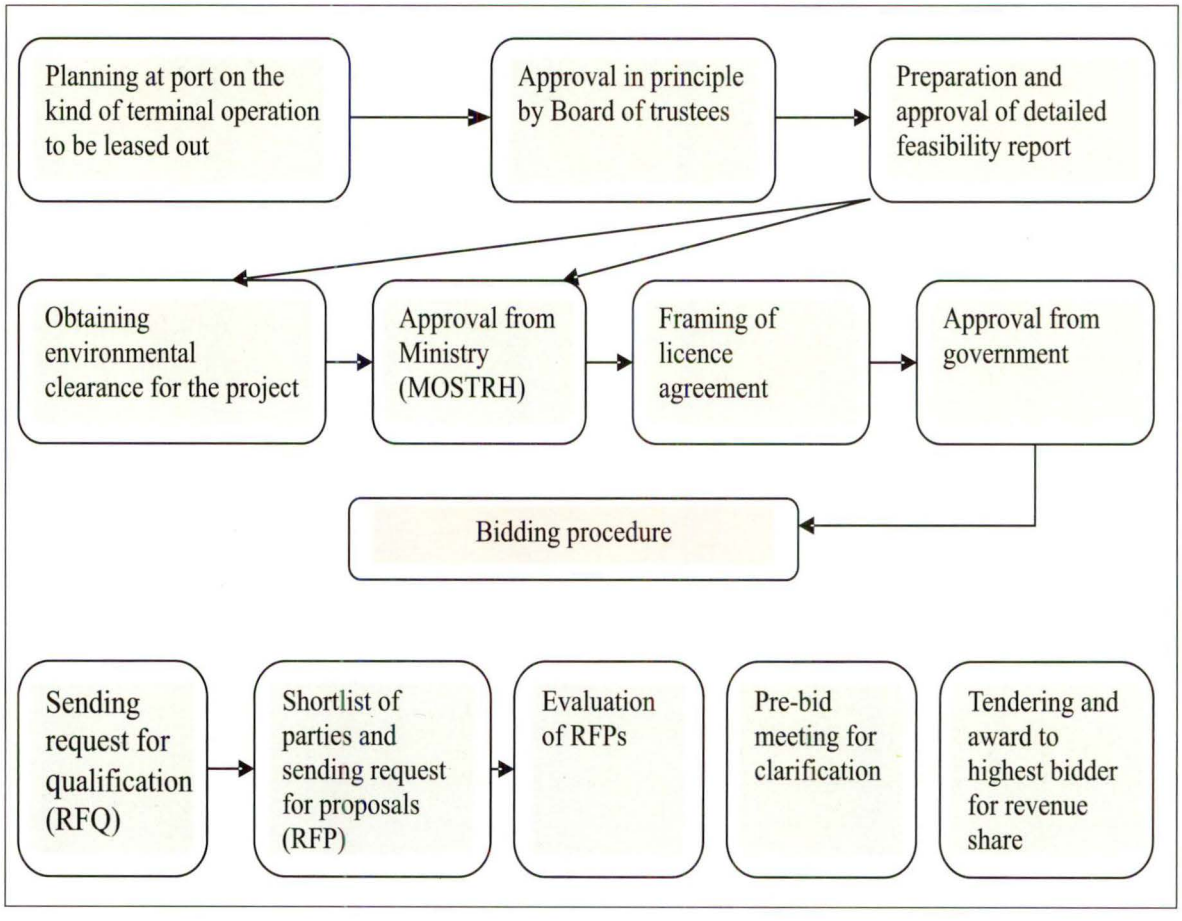
The projects taken up in Chennai under NMDP were based on a policy decision taken earlier (1999) that the port would be developed as a clean cargo port, primarily for handling containers. Dirtier cargo like coal and iron ore were planned to be gradually shifted to Ennore, the only corporatized major port in India located to the north of Chennai. Immediately following this decision, the handling of coal at Chennai showed a declining trend. The port also planned the development of a second container terminal under NMDP Phase-I and a third container terminal during Phase II by converting three existing coal handling berths and the coal stacking yard into a container storage yard. In spite of these development plans, coal handling again began to increase since 2005-06. In disregard of the plans of NMDP, the Chennai port signed (September 2007) a contract for installation of a semi-mechanised coal handling plant at a cost of Rs.42.83 crore and operation and maintenance of the same for five years at a cost of Rs.5 crore. The Management justified the investment stating that even though Ennore port was established in 2001, the entire thermal coal meant for power stations could not be handled there. Therefore, the coal handling at Chennai was on the rise. Thus, the vision of making Chennai port a clean port envisaged in 1999 and agreed to by the consultants, did not materialize. The investment made by the port was not along the lines of its stated long-term plans.

The Ministry stated (August 2009) that NMDP envisaged integration of all schemes for coordinated national development and efforts were being made for timely and coordinated implementation. The fact, however, remained that the schemes were being implemented haphazardly and there was no priority allocation among schemes as mentioned before.

6.3 Privatisation of Commercial Services

Even before the formulation of NMDP, the policy direction of the Government had been towards facilitating privatisation of commercial operations at ports. The Major Port Trust Act, 1963 was also amended in 2000 for the purpose, and the build-operate-transfer (BOT) option, was adopted for operation of terminals as shown below:

Planning of BOT projects at ports



Terminal leases at a glance		
No of terminals awarded to BOT operators	No of terminals in operation	Agreements without minimum guaranteed throughput[89] (MGT)
31	14#	3##
# Six container terminals-at Chennai, Cochin, JNPT, Tuticorin and VPT, two dry bulk berths- at Haldia and Visakhapatnam each and four liquid bulk berths at Chennai, JNPT and Kandla were in operation under lease. Liquid bulk berths were leased out only to PSU oil companies (except an SBM and oil jetty operated by M/s Essar Ltd at Kandla) ## No MGT in agreements for first and second container terminals in Cochin and cargo operation leases at berths EQ8 and EQ9 in Visakhapatnam		

Table 6.4

A number of private terminals were in operation on 30-year lease (except at Cochin and Mumbai) even before the commencement of NMDP. These included container terminals, liquid bulk berths and dry bulk berths. The terminal leases under operation are shown in Table 6.4.

Audit observed that a significant amount of traffic, viz. 70 *per cent* of total container traffic was being handled at the private terminals. During 2007-08, private terminals at Kandla handled more than 31 *per cent* of the liquid bulk handled at the port. Two out of three container terminals at JNPT were being operated on BOT basis, with the latest one, GTICT, commencing operations in 2006-07, as planned under NMDP Phase-I.

As mentioned earlier, the average daily output at private terminals of JNPT during the year 2007-08 was higher than the port-operated terminal by 11 *per cent*, indicating faster handling at the private terminals.

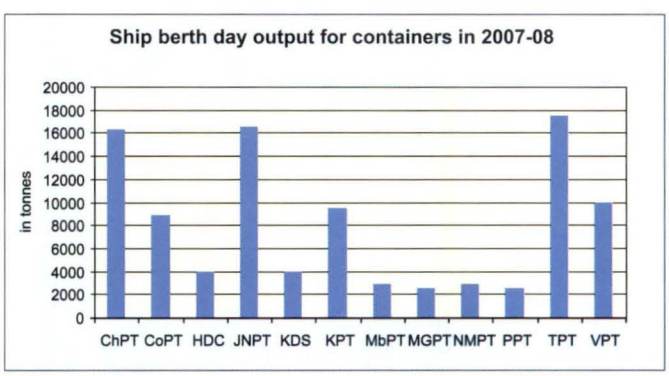


Fig 6.5

Similarly, it was noticed (Figure 6.5) that the output per ship berth day was significantly higher at Chennai JNPT and Tuticorin, where terminals were being operated by private operators. NMDP, in line with the landlord model, had targeted private investment of Rs 14562 crore amounting to 54 *per cent* of the total investment, during Phase-I of NMDP. The projects were in the

[89]The minimum volume of cargo that a BOT operator needs to handle per year at the terminal leased. For any shortfall in achievement of this target, penalty is to be paid by the operator to the port, at prescribed rates. The fixing of MGT is a critical exercise having a long term impact. At the optimum level, the port can ensure a significant revenue flow from the lease and the operator is incentivized to perform efficiently.

nature of leasing out of existing terminals, construction of new terminals on BOT basis, leasing of land for aggregation of cargo or other port related activities etc. Eighty five *per cent* of the private investment of Rs 14562 crore anticipated in Phase-I related to projects envisaged in four ports, viz. Cochin, JNPT, Kandla and New Mangalore.

Although the operation of private terminals had resulted in higher efficiency, only one BOT project among the ones planned in the first phase of NMDP, viz. the second BOT container terminal at JNPT, could be commissioned, although two years behind schedule. The status of other BOT projects is shown in Table 6.5 below

Port	Name of the project	Estimated cost (Rs in crore)	Private funds envisaged (Rs in crore)	Remarks
ChPT	Second container terminal	495	395	Completion delayed due to delay in handing over site by the port.
CoPT	International container trans-shipment terminal	2118	2118	In progress.
KPT	Container terminal at berths,11 and 12	271	155	Phase-I commissioned. Phase-II in progress.
MGPT	Cruise-cum- container terminal	185	82	Yet to be taken up.
MbPT	Offshore container terminal	1228	828	Project still to be completed. Security clearances took 20 months (March 2005 to November 2006). Components to be executed by MbPT yet to be completed.

Table 6.5

Among the BOT projects that were already in operation, Audit noted a number of issues as listed below:

6.3.1 Standards for minimum performance

The contract agreements with BOT operators provided for an MGT clause prescribing minimum expected levels of achievement. To ensure significant long-term revenue flow for the lessor and incentivise high volumes of handling by the lessee, it was imperative that the MGT was to be fixed at an optimal level.

It could not be ascertained in audit whether the actual MGT fixed in BOT agreements were based on accepted standards of performance or upon rough projections.

Port	MGT as per agreement	TEUs as per international benchmark	Actual handling	Achievement above global benchmark
ChPT	500000	880000	1128000	128%
NSICT	550000	660000	1508056	128%
GTICT	350000	783200	1290862	165%

Table 6.6

The BOT operators achieved outputs much higher than the MGT fixed by the ports (Table 6.6). This indicated that the ports had fixed very low targets.

In the case of a container terminal agreement signed by Chennai port in 2001-02, the port had recommended the UK benchmark for minimum throughput of 1500 TEUs per metre quay length for the operator, viz. Chennai Container Terminal Limited (CCTL). However, during finalization of the agreement, the minimum throughput fixed for the operator was fixed much below the benchmark at 1100 TEUs per metre quay length.

6.3.2 Shortcomings in BOT agreements

It was found that the concession agreements that the ports entered into varied widely, leaving scope for interpretation. An illustrative case study is given below:

Case study on standardization of clauses in BOT agreements:

Chennai port signed a BOT agreement for operation of a container terminal with M/s CCTL in 2001-02. Cochin port entered into a similar agreement with M/s Dubai Ports International in January 2005, following the commencement of NMDP. It was found that the agreements were very different and the Chennai agreement ensured much higher commitments from the operator than the Cochin agreement.

Chennai CCTL agreement	Cochin IGTPL agreement
Huge investment (US$50M) by the licensee, including state- of -the -art equipment.	**No such clause**
Clear performance parametres and MGT Develop Chennai as a hub port. Ensure calls from mainline vessels within 3 years. Minimum throughput to be contributed by non-transshipment traffic. Continuous failure for a period of 3 years to attract termination. Pay compensation for shortfall.	**No clear performance clause, MGT** Provide project facilities capable of handling mainline vessels. Endeavour to handle them from the second year of commercial operation. No minimum throughput. No compensation for shortfall.
No liability of port on account of power commitments In the event of disruption of power supply or breakdown in supply of power for any reasons whatsoever or for a planned maintenance shut down, no compensation whatsoever to be paid by licensor for any loss or damages.	**Power commitments underwritten by the port** Licensor to provide power supply. In the event of disruption of power/water supply for reasons attributable to the licensor only, the licensee to be compensated by the licensor for any direct loss or damage.

Clear Royalty payment clause – Licensee to pay the licensor 37.128 *per cent* of all revenue earned from operation, storage recovered/ charged from users. No deferment in payment of royalty. For delays interest @ 2 *per cent* month from the due date till the date of payment or realization, to be paid.	**Conservative clause for payment of royalty** Royalty per month to be equivalent of 33.30 *per cent* of the gross revenue. Gross revenue not to include income from interest, sale of assets, penalties or charges for delay not notified in the SOR, expenses incurred by licensee for providing services etc. Twenty five *per cent* of the royalty payable for each year to be deferred and to become payable in the start of the ninth year. Low interest on delayed payments.
Performance Security Licensee to provide the licensor with an irrevocable and unconditional performance security for an amount equal to the estimated revenue based on guaranteed traffic on the date of commercial operations and at the beginning of each succeeding year of operation.	**No Performance Security** Instead of performance security, a bank guarantee for Rs 10 crore for due performance of its obligations during the operations phase at RGCT and/or construction phase at ICTT and periodic renewal of the same to keep it valid until expiry of 3 months from the date of commercial operations.

As the performance incentives under the Cochin agreement were weaker, it was found that its efficiency in handling containers was also much lower compared to any other container terminals in India. Further, the vessels visiting the port faced high congestion due to delays in handling containers following frequent failures of cranes.

The number of container ships visiting Cochin's container terminal registered a decline as shown in Figure 6.6 below:

It was found that the operator had not installed any modern equipment to improve efficiency in cargo handling. The users of the port also reported that the existing equipment was insufficient to meet the present and future requirements. The business plan of Cochin port envisaged handling of containers in excess of three lakh TEU's per year. For meeting this target, the terminal area needed to be expanded along with addition of one more berth. Although the agreement provided for such initiatives to be undertaken by the operator, such actions were not undertaken. The MGT clause which could have driven the party to install better equipment and improve performance was not there in the agreement. Moreover, the licensee was also protected by the absence of penalty clauses.

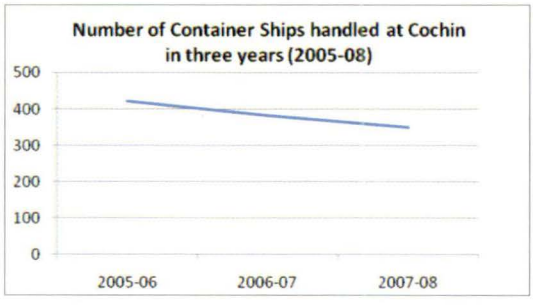


Fig 6.6

During the exit conference (June 2009), the Ministry agreed to the observation on shortcomings in BOT agreements, leaving scope for interpretation. It was pointed out that a model concession agreement (MCA) had been framed and circulated among ports and its effectiveness would have to be monitored.

Recommendations

- *The Ministry should formulate a clear time schedule for all stages of schemes and concerted efforts should be made to implement these schemes in a time-bound manner.*
- *Planning by individual ports should be aligned to NMDP, which is a national Plan document. Integration with other national Plans like that of the Railways and National Highways Authority of India should also be considered.*
- *While framing BOT agreements, performance benchmarks need to be fixed as per identified best practices. The Ministry should play an active role in identification of such best practices.*
- *Considering the number of high value schemes planned for the ports and their criticality to capacity augmentation, the delegation of financial powers at the level of port is low and needs to be reviewed, to enable faster implementation.*

(L.V. Sudhir Kumar)
Principal Director of Audit (Central), Kolkata

Dated : 21 January, 2010

Countersigned

(VINOD RAI)
Comptroller and Auditor General of India

New Delhi
Dated : 25 January, 2010

Annexure
(Refer Para No. 6.2.1)
Status of schemes under Phase- I of National Maritime Development Programme

Name of the Port	Name of the Project	Type *	Estimate (Rs in crore)	Budgetary Support (Rs in crore)	Private funds estimated (Rs in crore)	Date of commencement as per NMDP	Date of commercial operation as per NMDP	Date of actual completion / % execution of the project if WIP	Completed (C)/ WIP (W) /Not commenced (N) / Dropped (D)
1	2	3	4	5	6	7	8	9	10
ChPT	Second container terminal	B	495	0	395	31 January 2008	31 March 2008	70	W
CoPT	International Container Transshipment Terminal(ICTT)	B	2118	0	2118	01 April 2007	01 April 2009	68	W
CoPT	LNG Re-gasification Terminal	B	1600	0	1600	2005-06	2009-10		N
CoPT	Crude Oil Handling for Kochi Refineries Ltd.	B	720	0	720	2005-06	2007-08	100	C
HDC	Multipurpose berth(No.2) inside the impounded dock	B	46.8	0	0	October-2005 (construction work)	January 2007	July 2010	W
HDC	Multipurpose berth (No.13) inside the impounded dock	B	39.56	0	39.56	December-2005 (Construction work)	March 2007	July 2010	W
HDC	Riverine jetty north of existing Lock Gate	B	30	0	0	February-2006 (Construction work) after obtaining Environmental Clearance and processing of tender	June 2007		N
HDC	Riverine jetty north of existing 3rd Oil Jetty	B	45	0	45	March-2006 (Construction work) after obtaining Environmental Clearance and processing of tender	July 2007		N
JNPT	Redevelopment of Bulk Terminal into Container Terminal	B	900	0	900	August-2004	August 2006	October 2006	C
JNPT	Extension of Container berth by 330 m and other facilities	B	453	0	285	December-2006	December 2007	January 2012	N
KDS	Development of infrastructure in the docks and allied facilities	B	12	0	0	December-2005 to March-2007	March 2008	Scheme had attained completion in March-2009	C

*B: construction of berths C: connectivity projects D: deepening projects
*E: procurement of equipment O: others

KPT	Construction of 12th Cargo Berth including Back-up area & setting up of state of art container Terminal through BOT at 11th & 12th Cargo berth with back up area of 40 hectares.	B	271	0	155	March 2005	August 2006		W
KPT	Setting up of marine terminal by M/s VOTL at Vadinar for M/s Essar Oil Ltd.	B	750	0	750	May 2004	December 2006		W
KPT	Modification of Bunder Basin for barge handling	B	10	0	0	March 2004	May 2006		C
KPT	Additional facilities for handling crude oil at Vadinar(i) Procurement of different crafts (Estimated Cost 17.41 crore) (ii) Construction of extension jetty (Estimated Cost 4.50 crore) (iii) Construction of T-Shaped Service Jetty along with allied facilities (Estimated Cost 28.09 crore)	B	50	0	0	June 2007 and August 2007	June 2008 and March 2009		W
KPT	Construction of 13th & 14th Cargo Berth at Kandla	B	100	0	0	March 2006 and May 2006	November 2007 and January 2008		N
KPT	Construction of 15th to 18th cargo berth on BOT Basis including mechanization	B	430	0	0	January 2007	January 2009		N
KPT	Creation of Berthing and allied facilities off Tekra near Tuna (outside Kandla Creek)	B	1200	13	498	March 2007	March 2009		N
MbPT	Construction of two offshore container terminal. Development of two container berths of total quay length of 700 Mtr. and related upgradation for handling vessels of 6000 TEUs capacity. Capacity (0.8 MTEUs)	B	1228	0	828	31 March 2006	31 March 2009		W
MbPT	Redevelopment of 18 to 21 ID, Harbour Wall Berths. Upgradation of the four berths to three berths to handle larger & deep drafted general cargo vessels.	B	259	0	0	31 March 2007	31 March 2009		N
MbPT	Construction of 2nd berth for handling chemicals/specialised grade of POL off Pir Pau Pier.	B	90	0	0	31 December 2006	31 December 2008		N

MbPT	New cruise terminal near Gateway of India.	B	152	0	70	31 December 2007	31 March 2009		N
MGPT	Construction of cruise-cum container berth at Baina	B	185	0	82	31 August 2006	28 February 2009		N
NMPT	Construction of Addl. General cargo berth	B	49	0	0	27 September 2007	April 2006	31 March 2008	C
NMPT	Setting up of Dry Dock with repair facilities for Ocean going vessels & other Floating crafts at NMP	B	125	0	125	December 2006	December 2008		D
NMPT	Development of LNG Terminal	B	2600	0	2600				N
NMPT	Development of Coal Handling	B	180	0	180	January 2006	December 2008	Work in progress	W
PPT	Extension of Iron Ore berth to handle 75000 DWT vessel	B	10	0	0	1 January 2005	31 May 2006		W
PPT	Creation of additional facilities for Oil Jetty	B	15	0	0	February 2006	March 2008		W
PPT	Extension of break-water Ph.I	B	20	0	0	November 2007	November 2010		N
PPT	Extension of wet basin and construction of integrated dry dock	B	18.53	0	0	1 November 2003	31 March 2006		W
TPT	Construction of Coal Berth at NBW for NLC - TNEB	B	40	0	0	July 2006	November 2007		N
TPT	Construction of Berth 9	B	40	0	0	March 2006	November 2007	76	W
TPT	Reclamation and heavy duty pavement	B	15	0	0	January 2007	November 2007		N
TPT	Construction of shallow draught Berth (3 Nos.)	B	30	0	0	October 2006	November 2007		N
TPT	Structural Upgradation of Coal Jetty II	B	5	0	0	October 2006	November 2007		N
VPT	Strengthening of EQ5 & EQ6, WQ2 & WQ3 to cater to 11 Mtrs draft vessels	B	20	0	0	April 2006	April 2007		N
VPT	Allotment for development of WQ6 berth in the Inner Harbour for Alumina exports	B	145	0	140	January 2007	December 2008		N
VPT	Allotment of WQ7 berth for captive user for Alumina exports	B	140	40	0	March 2007	December 2008		N

VPT	Strengthening of EQ5, EQ6, EQ7, WQ1,WQ2 WQ3 WQ4,WQ5 & WQ7 to cater to 12.5 Mtrs draft	B	30	0	0	May 2006	May 2007		N
VPT	Relocation of oil mooring facilities	B	20	0	0	December 2006	December 2007		D
ChPT	Port Connectivity Bridging Gap in EMRIP project	C	50	0	0	31 January 2006	31 March 2007	0	D
ChPT	Dedicated elevated corridor on NH-4 from Port to Maduravoyal	C	400	0	0	1 January 2007	31 March 2009	Work executed by NHAI	W
CoPT	National Highway connectivity	C	350	90	0	1 July 2006	1 January 2009	47.96	W
CoPT	Rail connectivity	C	125	0	0	1 July 2006	1 January 2009	75	W
JNPT	Improvement of road connectivity Package I NH4B Package-II SG54 Amra Marg	C	357	0	0	Package-I-February-2002 Package-II October-2004	Package-I-February-2002 Package-II October-2005	Package-I-February 2002 Package-II October-2004	N
JNPT	Internal Port Road widening	C	37	0	0	February 2005	December 2007	March 2009	C
JNPT	Rail work Extension of doubling beyond holding yard leading to terminal 1,2 & 3	C	20	0	0	January 2007	December 2008	NYA	N
JNPT	Road work Construction of Grade separator through SPV of Port connectivity	C	80	0	0	April 2007	March 2009	NYA	N
JNPT	Construction of addl. Rail lines in Jasai yard and holding yard and extension of electrification	C	22	0	0	April 2007	March 2009	NYA	N
JNPT	Construction of Sorting yard for handling mix trains	C	40	0	0	April 2007	March 2009	NYA	N
JNPT	Internal Port road widening Stage-II	C	45	0	0	April 2007	March 2009	March 2012.	W
JNPT	Construction of second link road to Port	C	168	0	0	April 2007	March 2009	NYA	N
JNPT	Six Lanning of NH 4B	C	45	0	0	April 2007	March 2009	NYA	N
JNPT	Construction of second evacuation road	C	45	0	0	April 2007	March 2009	NYA	N
JNPT	Road connectivity to Port	C	300	0	0	April 2007	March 2009	NYA	N

KPT	Extension of Road & Rail-way network in the rear of back up area from berth no. 11 to 18 at Kandla. (Estimated Cost Rs.15.00 crore)	C	57.49	0	0	January 2006 and February 2008	January 2007 and January 2009		W
KPT	Construction of ad-ditional carriage way for four -laning of road from kutch salt junction to west gate no. 2 at kandla (Estimated Cost Rs.7.70 crore)	C				August 2004 and August 2006	November 2005 and March 2007		W
KPT	Providing railway net-work in newly developed cargo jetty (Estimated Cost Rs.13.00 crore)	C				June 2006 and February 2008	June 2007 and Mar 2010		W
KPT	Four laning of existing road from national highway 8A upto jetty complex. (Estimated Cost Rs.21.79 crore)	C				January 2006 and January 2007	July 2007 and July 2007		W
KPT	Gandhidham Palanpur Gauge conversion (which will reduce distance from Kandla from Northern Hinterland by 114 Kms.)	C	52	0	0	2004	March 2006		C
KPT	Gauge conversion of Bhildi Samdari Segment	C	35	0	0	March 2006	March 2008		W
MbPT	Improvement of Rail & Road infrastructure. Rail connectivity between wadala & Kurla, 2 Road improvements within MbPT estate, 3 Road improvements outside MbPT estate, Wadala Mahul to Truck Terminus Link 4.Anik Panjarpol Link	C	328	0	0		31 August 2008		W
NMPT	Improvement to Port internal roads.	C	50	0	0			80	W
NMPT	Road connectivity to the Port.	C	896	0	0		2008	Work in progress	W
NMPT	Addl. Rail connectivity to the Port from the exist-ing KRCL railway.	C	50	0	0		2008		N
PPT	Upgradation of Paradip Railway Yard, Signalling, Station building	C	25	0	0	March 2006	March 2008		W
PPT	Upgradation of road inside Harbour Area	C	15	0	0	7 February 2006	2 nos. by 31 March 2006 & other 3 nos. by 31March 2007		W

TPT	Four- laning of NH 7A between TPT and Palayamkottai.	C	25	0	0	April 2004	June 2006		W
VPT	Development of addl. Link road from port junction to the industrial by pass road.	C	95	0	0	16 June 2002	31 December 2005	15 December 2006	W
VPT	Improvement to road infrastructure with road bridges/fly over bridges	C	30	0	0	May 2005	March 2007	(A)	W
VPT	Improvement to road infrastructure with road bridges/fly over bridges Phase-II	C	55	0	0	March 2007	September 2008		N
VPT	Development of interchange Yard at Vadlapudi and Reception and Despatch yard at Mindi and associated facilities.	C	81	0	0	December 2006	December 2008		N
VPT	Improvement to port railway system	C	30	0	0	October 2002	31 March 2007	(A)	W
ChPT	Deepening of Channels, Basin and Berths	D	143	48	0	31 July 2006	31 March 2009	68	W
CoPT	Capital dredging for providing 12.5 m draft at RGCT	D	33	0	0	13 May 2005	December 2006 (Date of completion of work)	February 2006	C
CoPT	Capital dredging for ICTT 1st stage for 14.5 m draft and LNG basin to create a draft of 11.5 m	D	379	189	0	01 April 2007	31 March 2009	36	W
JNPT	Deepening & widening of main harbour channel and JN Port Channel Phase I to increase draft from 12.5 m. to 14.0 m.	D	800	0	0	September 2006	December 2008	NYA	N
KDS	River Regulatory Measures for improvement of Draft in Hooghly Estuary from average 8.5 m to 9.0 m and reduce annual maintenance dredging by 2 million cub. Mtrs.	D	385	385	0	2006 2007	Expected completion after 5 years	NYA	N
KPT	Deepening of Navigational channel of KPT from 11.7 m to 13.5 m draft	D	136	68	0	April 2008	July 2008		W

MGPT	Deepening of Approach Channel and berth no. 9 to increase the draft from 14.10 m. to 15.10 m.	D	65	32	0	31 October 2006	31 October 2007		N
NMPT	Deepening of Channel & lagoon area to create a draft of 14 m (In front of DDGB Berth)	D	10	0	0			17 January 2006	C
NMPT	Improvement of Draft and Strengthening & Deepening of General Cargo Berths to increase	D	10	0	0			Work in progress	W
PPT	Deepening of channel from 13.0 m to 17.1 m to handle 1,25,000 DWT vessels	D	154.84	103.23	0	February 2006 subject clearance by GOI	July 2003		N
PPT	Enhancement of draught at existing dock system from 12.0 m to 14.0 m to cater to Panamax vessel	D	40	40	0	August 2006	December 2008		N
TPT	Dredging the Dock Basin and Channel to increase the draft from 10.70 m to 12.80 m.	D	450	225	0	June 2006	November 2007		N
VPT	First Stage - Deepening and widening of inner harbour entrance channel and turning circle from draft of 10.6 m to 11 m.	D	30	0	0	30 July 2005	31 May 2006	74%	W
VPT	Second Stage- Deepening of Inner harbour entrance channel and turning circle from 11.0 m to 12.5 m.	D	50	7	35	July 2006	July 2007		N
VPT	Enlarging the scope of outer harbour for 2,00,000 DWT Iron ore vessels by deepening outer channel from 16.5 to 18.1 m.	D	193	96	0	April 2007	March 2009		N
ChPT	Replacement of Wagon Tippler	E	5.14	0	0	04 August 2004	27 July 2005		D
ChPT	Desalination projects of 1000 MT per day	E	6	0	6	30 March 2006	31 December 2006		D

HDC	Procurement of 2 RMQCs for container handling (including RMQC track and cabling)	E	49.91	0	0	Erection work already commenced	October 2005		C
HDC	Procurement of 4 RTGCs for container handling at CPY	E	21.28	0	0	Construction work is in progress	February 2006		C
HDC	Procurement of 2 No.s Stacker-cum-Reclaimer	E	24.7	0	0	January 2006 (construction work)	April 2007		N
HDC	Acquisition of 2 nos. Mobile Harbour Cranes	E	30	0	30	March 2007	July 2007		N
JNPT	Acquisition of two RMGCs	E	24	0	0	July 2005	June 2006	June 2007	C
JNPT	Procurement of 20 nos. of Tractor Trailers	E	11	0	0	August 2005	March 2006	August 2006	C
JNPT	Acquisition of three RMGCs	E	76	0	0	June 2006	August 2007	27 months after approval from the Ministry.	N
JNPT	Procurement of one RMQC and shifting of two old RMQC and shifting of two old RMQC at SWB	E	25	0	0	August 2006	December 2007	12 months after award of work.	N
JNPT	Acquisition of six RTGCs	E	30	0	0	August 2006	December 2007	NA	N
JNPT	Replacement of three Pilot launches, one VIP launch, one Utility launch and procurement of Pollution control vessels	E	22	0	0	June 2006	December 2008		W
JNPT	Replacement of One RMGC on line 1 and 2	E	12	0	0	December 2007	December 2008	NYA	N
JNPT	Replacement of three tugs	E	90	0	0	February 2008	March 2009		N
KDS	Procurement/Replace-ment of Cargo handling equipment.	E	25	0	0	January 2005 to March 2007	March 2008	March'2010 (Anticipated)	W
KDS	Modernisation/Replace-ment of Port Craft	E	14	0	0	February 2006	Vessel expected to be delivered by March 2008 sequel to which it would be ready for operation.		C
KPT	Procurement of 6 nos. ELL Wharf Cranes (i) Present Till Cranes (3 nos.) (Estimated Cost Rs.29.00 Crore) (ii) New Cranes (03 Nos.) (Estimated Cost Rs.24.32 crore)	E	53.32	0	0	4 October 2004 and December 2005	April 2006 and February 2007		W

KPT	Up-gradation of Marine Infrastructure/Flotilla for Handling Larger Vessels.1. No.50 Ton Harbour Tug for Kandla (Estimated Cost Rs.17.91 crore) 2. No. Pilot Launches one each for upgradation of flotilla at Kandla and Vadinar (Estimated Cost Rs.7.10 crore) 3. Remaining items :- (i) 2 nos. 50 ton tugs for tuna (Estimated Cost Rs.40.00 crore) (ii) 01 No. 50 Ton Tug for Vadinar (Estimated Cost Rs.20.00 crore) (iii) 03 nos. Tugs of 30 Ton for Kandla (Estimated Cost Rs.45.00 crore) (iv) 04 nos. Pilot Launches 02 for Kandla and 02 for Tuna (Estimated Cost Rs.16.00 crore) (v) 02 nos. Mooring Launches for Tuna (Estimated Cost Rs.8.00 crore)	E	154.01	0	0	February 2005, August 2005, October 2007, March 2007, March 2009, October 2007 and October 2007	August 2006, August 2007, March 2009, November 2009, November 2010, March 2009 and March 2009		W
MbPT	Procurement of 2 nos. 32 T Bollard Pull Harbour Tugs.	E	24.98	0	0	7 December 2004	31 March 2006	100	C
MbPT	Replacement of caisson gate at HDD.	E	12.53	0	0	30 April 2006	30 November 2007	75	W
MbPT	Replacement of 3 Dock by 2 Dock tugs.	E	19	0	0	31 March 2006	31 March 2008	100	C
MbPT	Modernisation of cargo handling equipments. Procurement of 2 nos. QGCs, 2. Procurement of 3 nos. RTGs, 3 Procurement of 10 nos. 6 Tonnes Ell wharf cranes.	E	114.55	0	0	30 April 2007 31 March 2006	31 October 2008 & 31 May 2008 31 October 2007	92	W
MGPT	Replacement of remaining four barge unloaders	E	33	0	0	31 January 2005	31 March 2007		N
MGPT	Replacement of one bucket wheel reclaimer	E	15	0	0	28 February 2006	31 October 2007		N
MGPT	Replacement of one Ship loader	E	15	0	0	28 February 2006	31 October 2007		N
MGPT	Replacement of two stackers	E	15	0	0	November 2005	31 December 2008		N
MGPT	Installation of wagon handling system	E	80	0	80	30 June 2006	31 December 2007		N
MGPT	Tran shippers for Iron ore export	E	140	0	140	September 2006	31 December 2008		N

NMPT	Procurement of Harbour Crane	E	30	0	30				N
PPT	Replacement of wharf crane	E	12	0	0	25 September 2004	31 March 2006		N
PPT	upgradation of Iron Ore Handling Plant	E	30	0	0	March 2006	March 2008		W
TPT	Conversion of Berth 8 as container terminal (BOT)	E	150	0	150	01 June 2006	27 August 2007		N
TPT	Replacement of Old Crane at Berth I & II	E	25	0	0	January 2006	31 December 2006		W
TPT	Floating Craft Procurement	E	60	0	0	January 2006	November 2007		N
TPT	Replacement of Rajaji Tug	E	27.25	0	0	28 August 2004	February 2006	29 August 2006	C
TPT	Replacement of Kamaraj Tug	E	22	0	0		November 2007		N
VPT	Mechanized cargo handling facilities at GCB at Outer Harbour	E	50	0	0	August 2006	March 2008		N
VPT	Mechanized cargo handling facilities at 2 berths on Western side of Northern arm at Inner harbour	E	25	0	25	January 2007	June 2008		C
VPT	Modernization of iron ore handling complex (Replacement of stacker, control panels, circuit breakers, HT motors etc)	E	15	0	0	April 2006	October 2007		N
VPT	Replacement of 1 tug (TT Swarna)	E	20	0	0	October 2006	March 2008		W
VPT	Replacement of 2 nos. Locos by 1430 HP	E	14	0	0	March 2007	March 2009	I loco- 27 February, 2007 II loco-19 February 2008	C
ChPT	Modernisation of Chennai Port	O	200	0	0	Work already commenced for Ph.I, Dev. Work costing Rs.40 crore with Board's approval	31 March 2009	90	W
ChPT	Creation of addl. Open storage yards by reclamation	O	200	0	0	01 April 2006 & 01 October 2006	01 October 2007 & 31 October 2008	70	W
ChPT	Development of Back up area at Sthangadu off Dock CFS	O	50	0	0	01 January 2006	31 March 2007		N
ChPT	Multilevel Stack yard for Automobile export	O	48	0	0	01 April 2006	31 October 2006		N

CoPT	International Bunkering Terminal	O	195	0	170	2005-2006	Phase-I: 2007-08 Phase-II: 2011-12		N
CoPT	International Ship Repair Complex	O	315	0	315	December 2006	December 2010		D
CoPT	Port based special Economic Zone	O	1510	0	1412	2006-2007	Various dates but be completed by 2011-12		W
CoPT	International Cruise Terminal	O	55	0	12.1	July 2006	July 2008		N
CoPT	Reclamation for streamlining of Flow in the Port Channel for reducing siltation and for future development works	O	120	0	0	December 2006	December 2009		N
CoPT	Construction of Breakwaters	O	80	0	0				N
HDC	Acquisition of Land at Jellingham for dumping of dredged spoil. (1st phase of acquisition of 2500 acres)	O	50	25	0	November 2005 acquisition proceedings by State Govt. as per LA	Not applicable		N
HDC	Development of Road Infrastructure including drainage, etc. inside and outside dock (in phases)	O	30	0	0	Construction work is in progress	Not applicable	July 2010	W
HDC	Improvement of Back up Area with Railway connectivity inside the Dock (in phases)	O	25	0	0	Construction work is in progress	April 2006 onwards		C
JNPT	Area development behind SWB and development of ICD yard	O	16	0	0	November-2004	December 2005		C
JNPT	Infrastructure facilities for Port based industries	O	45	0	0	September 2005	December 2007	March 2012	W
JNPT	Environmental measures	O	10	0	0	June 2007	March 2009		W
JNPT	Infrastructure facilities for Port Based industries Ph-II	O	45	0	0	April 2007	March 2009	March 2012	W
JNPT	Environmental measures	O	20	0	0	May 2007	March 2009	March 12	W
KDS	Upgradation/extension of VTMS up to Kolkata with accessories and night navigational aids etc.	O	11	0	0	February 2006 to December 2006	Scheme expected to be commissioned by March 2008 after which it would be ready for operation.	March 2010 (Anticipated)	W

KPT	Upgradation of infra-structure facilities in newly added custom bounded area (66 hectares)	O	33	0	0	February 2005	May 2005		C
KPT	Development of open storage facilities	O	53	0	0	January 2006	November 2007		W
KPT	Construction of Storage Godown	O	22	0	0	July 2003	October 2006		C
KPT	Construction of Ship bunkering complex	O	400	0	296	August 2006	February 2008		N
KPT	Augmentation of Water Supply at Kandla	O	12.8	0	0	December 2003	December 2006		W
KPT	Captive Power Plant at Kandla.	O	18	0	0	April 2006	April 2008		N
MGPT	Strengthening of break-water	O	25	0	0	31 August 2006	31 Decem-ber 2007		W
NMPT	Development of Mar-shalling Yard	O	30	0	10		September 2007	Work in progress	W
NMPT	Allotment of land for setting up of iron & coal Handling facilities for the proposed Multipurpose Berth	O	150	0	150	June 2006	March 2008		N
NMPT	Development of Bunker-ing facilities at NMP.	O	10	0	10	May 2007	November 2007		N
NMPT	Development of Port based SEZ	O	50	0	40				N
PPT	Illumination of Storage Area	O	10	0	0	30 July 2005	31 Decem-ber 2006		N
TPT	Widening & strengthen-ing of port roads from Western boundary to green Gate and strength-ening of approach road, Ambedkar road with bituminous layer	O	17	0	0	January 2006	December 2006	30 June 2008	C
TPT	Usage of information technology for the operation and manage-ment of port.	O	5	0	0		November 2007		W
TPT	Conversion of HT / LT Over head Lines.	O	10	0	0				W
TPT	Up gradation of Port Electrical System	O	20	0	0				W
TPT	Auxiliary facilities	O	20	0	0	April 2006	November 2007		W

VPT	Transit shed of 5,000 sq.mtrs. and Open Storage shed (2 nos.) of 20,000 Sq.mtrs.	O	19	0	0	i) 31 July 2005 for T8 shed; and ii) 28 Feb-ruary 2006 for 2 open storage sheds	28 February 2007	21 February 2007 for T-8 shed over-all physical progress-32%	W
VPT	Allotment of land for development of ware houses in Phase-I	O	20	0	20	February 2006	February 2007		D
VPT	Environmental up-grada-tion schemes. Phase-I	O	17	0	0	January 2006	March 2009	(A)	W
VPT	Shifting of non VPT periodical maintenance examination activities at ore exchange yard to separate	O	12	0	0	April 2006	March 2007		D