Formulation of Novel Strategies to Abate Various Challenges for the Growth and Ecological Balance of Chennai Port

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Abstract
In the sea borne trade of India the Chennai port comes under the category of most important ports in east coast. It is growing as a core port of handling container in the east India. In tune with International norms Chennai Port develops novel strategies to abate various challenges for the migration of Chennai Port into a Green Port to protect the sea front from pollution. Discharge of solid and liquid waste from ships and the operations in the port impacts the maritime environment. The higher activity in the port showing greater impact on its ecology. There has been a phenomenal increase in the traffic at Chennai Port. It is time to institute remedial action to reduce and combat the impact of port operations on the maritime environment. The objective of this paper is to discuss specific measures taken to reduce pollution and other related problems in maritime transport. Conceptual research design is followed in the study. It concludes from the study that if the port and its industry want to be competitive then a joint approach between the port and the rest of authorities and companies is required. Together they must generate the proper conditions for a sustainable development in the required areas.

Key words: Chennai Port, Novel Strategies, Pollution, Ecology, Sustainable development

Introduction
Chennai Port which is situated in the Coromandel Coast in South-East India is the third oldest port among the 12 major ports and it has more than 100 years of tradition. Chennai Port serves up the geographical areas of Tamil Nadu, Pondicherry, South Andhra Pradesh and parts of Karnataka and emerged as hub on the east coast of India since it is strategically located and well connected with major parts of the world. This gateway port for all cargo has completed 128 years of glorious service to the nation’s maritime trade. Major commodities being handled at the Port are Containers, Automobiles Exports, POL, Iron Ore, Coal, Fertilizers (products and raw materials), and general cargo items. Chennai Port was the first port to start container handling operations with the assistance of Chennai Container Terminal Pvt. Ltd. (CCTL) in 2001 for operating under Build, Operate & Transfer (BOT) basis.

Since the marine activity is increasing continuously in and around the Chennai Port, there is an urgent need to develop the Port as a green port in compliance with national and international legislations. As per regulations set by MARPOL 73/78 and EU directive 2000/59/EC on port reception facilities for ship-generated waste and cargo residues, ports should provide reception facilities for vessels to safely dispose and manage various types of wastes. Therefore Chennai Port focuses on some required strategic efforts for sustainable growth and development of operations to meet the international standards.

Review of literature
According to Anming Zhang (2008) when ports compete in quantities, an increase in corridor capacity will increase own port’s output, reduce the rival port’s output and increase own port’s profit. On the other hand, an increase in inland road capacity may or may not increase own port’s output and profit, owing to various offset effects. Essentially, while more road capacity reduces local delays and moderates the negative impact of own output expansion, it induces greater local commuter traffic in
response to a rise in cargo traffic, both of which reduces own output and profit. Similarly, inland road pricing may or may not increase own port’s output and profit.

In the view of Deloitte (2012) to achieve the significant growth in container traffic, it is of paramount importance for Chennai Port to devise a plan to handle the landside transportation of the traffic through the Port and City to the hinterland. Otherwise the full growth potential of Chennai Port will not be realized and competitors may gain the upper hand, diverting the traffic that should rightly be handled by Chennai Port. It also must improve both of its existing internal road / rail system and its hinterland connectivity to retain its competitive advantage. Chennai Port must also reduce its heavy dependence on road transport to avoid increased congestion and efficiency loss at the existing and future terminal developments.

As stated by MARPOL 73/78 regulations act, all oil carrying ships are required to be capable of operating the method of retaining oily wastes on board through the “load on top” system or for discharge to shore reception facilities. Segregated ballast tanks are required on all new tankers of 20,000 dwt and above, must be fitted with large enough to provide adequate operating draught without the need to carry ballast water in cargo oil tanks. Protocol also required SBTs to be protectively located – that is, they must be positioned in such a way that they will help protect the cargo tanks in the event of a collision or grounding. New oil tankers are required to meet certain subdivision and damage stability requirements so that, in any loading conditions, they can survive after damage by collision or stranding.

According to Nisha Taneja (January 2013) Sea transport is considered the most well developed mode of transporting goods from India and maximum reforms have taken place at sea ports. However, there continue to be a number of inefficiencies in using the sea route for trade within South Asia. There are capacity constraints at many of the ports, together with heavy siltation at channels where depths fluctuate with tides. Physical barriers include old and poorly maintained cargo and ship-handling equipment, old floating craft, poor road and rail connectivity and a lack of Roro ferry vessels and passenger handling facilities at Cochin and Tuticorin.

In the view of Policy Research Corporation of European Commission, Directorate-General for Maritime Affairs and Fisheries (August 2009) ports are increasing their activities to adapt their operations to ensure that their actions are sustainable. The process is to a large extent driven by EU legislation that imposes norms in order to protect the environment. More visits by tourists, particularly those arriving on cruise ships, will increase the pressure on the quality of the environment in ports. This trend will translate into additional environment-related costs, which will have to be considered when investment decisions are taken

Roso.V (2007) stated that in the case of linking to a seaport, efficient distribution and environmental benefits are achieved by setting up the link through a high-capacity rail link. An economic premise is that the high-capacity or high efficiency rail connection must operate with a lower unit cost than the transport of containers by road. The containers are collected from the seaport and distributed to their ultimate destinations with the modal transfer between rail and road taking place at the inland site.

Strategic efforts taken against Challenges of Chennai Port
a) Challenges posed by weather conditions

At Chennai Port, being located on an open straight coast, the challenges of port development were critical because of prevalence of two monsoons viz. southwest monsoon during months of June to September and north east monsoon during the months of November to February. These monsoons cause wave actions associated with littoral drift. It is learnt that the littoral drift caused due to southwest monsoon season is much more dominant compared to northeast monsoon. The orientation of the port entrance was planned facing north to avoid siltation in the approach channel and at the entrance resulted in reduced menace from the littoral depth. \(^{(1)}\)

In order to mitigate siltation at the entrance of the port, a long bund termed as ‘Sand Screen’ was constructed at the Surf Zone, which gave a relief against siltation process at the port entrance. The severely eroded portion north of Chennai port has been fruitfully used for developing outer harbour with entrance facing north. Subsequently a fishing harbour has been developed on the north side of the outer harbour with the entrance facing towards north. As a result of the orientation of entrance facing
north, overlapping breakwaters of ports and fishing harbour, the siltation at the entrance has been minimal.

There has been severe erosion north of fisheries harbour for several kilometers due to lack of sand supply from southern region. Due to the erosion, the Ennore Expressway north to the port has been endangered.

The Chennai - Ennore Port connectivity Project has been taken up by National Highways Authority of India (NHAI) through a separate special purpose vehicle company named Chennai Ennore Port Road Company Limited. Sea protection works including construction of groins is an important feature in this scheme.

On the south side of Chennai Port, there has been progressive creation of beach and this is creating additional land. By and large this has a beneficiary effect in the form one of the long artificial beaches in the world

b) Pollution related issues:

Chennai Port is committed towards protecting the sea front from pollution and shares the international concern for this environmental issue. Discharge of solid and liquid waste from ships and the operations in the port impacts the maritime environment. Higher the activity in the port, greater is its impact on ecology. The sources of marine pollution according to the framework of International Law are: Land-based sources and activities; shipping and other sea-based activities such as fishing; dumping; seabe activities; and atmospheric sources. There are over 200 international instruments to deal with every aspect of the environment, in particular, to protect the marine environment.

The impact of some environmental related issues which have a heavy bearing on the pollution at Chennai port are being discussed below:

→ Impact of Coal supply and remedial measures: The port handles around 8 million tonnes of coal for clients such as the Andhra Pradesh State Electricity Board, Karnataka Power Corporation, cement plants of Tamil Nadu and independent power producers in northern Tamil Nadu and southern Andhra Pradesh. In 2005, as part of pollution-control measure, the port has installed wind curtains made of ultraviolet resistant fabric along the harbour's beachfront for over 1.5 km to the east of the coal terminal to prevent wind carrying coal dust into the city at a cost of ₹3.7 million. In 2008, the port has also installed a semi-mechanised closed coal conveyor system comprising two streams with a capacity of 15 million metric tons/annum and a handling rated capacity of 1,500 metric tons/hour/stream and running for a length of 5 km at two berths, namely, Jawahar Dock IV and VI, at a cost of ₹430 million to transfer the coal to the individual coal plots at the southern end of the port, from where the cargo will be transported by rail to respective destinations, thus preventing pollution from coal dust and eliminating movement of coal-carrying trucks within the port.

→ CO2 emissions in maritime transport:

Chennai Port aims to address the specific measures to reduce CO2 emissions in maritime transport, as the following. (2)

- Promotion of energy efficiency in port services.
- Generation and use of renewable energies in ports.
- Promotion of rail-port connections.
- Waste or oily water collection;
- Emission reduction: Provision to provide electricity to ships to enable them to connect to the external systems for their electrical supply.
- Energy business plan: The guidelines and targets to rationalise and optimise energy management.
- Study the possibility of using renewable energies generated in the port for their own consumption. A separate scheme for harvesting renewable energy resources (at the sea) is being planned for implementation.
Development of feasibility studies to implement a power supply system for ships connection while they are in the port, so that they can turn off their auxiliary engines and consequently reduce the emissions of greenhouse gases, noise and vibration in the port area.

Promote the use of low emissions vehicles in the port area, or use hybrid and / or electric vehicles.

c) Challenges due to natural disasters
The Indian Ocean Tsunami of 26 December 2004, one of the deadliest in the recorded history, had a devastating effect all over the region and, of course, damaged the port's infrastructure, including cranes, wharfs, moorings and some part of the ship channel and hindered the operations of the port for a brief period. Some of the ships hit the wharves close to where they were berthed. The total damage to property, infrastructure and equipment at the port due to the tsunami stood at ₹129.6 million. As a consequence of the tsunami, the port trust is planning to create an artificial beach from left of the Cooum river which is next to the Napier Bridge, right up to fishing harbour in North Chennai covering about 10 km to protect the port from seaside from similar natural calamities. The beach is planned within the port's territory, before the east breakwater on the seaside and would not be accessible to the public. In addition, the port is also planning to reclaim the land adjacent to the Cooum during the Tenth Plan.

d) Traffic Congestion

(Fig-1) A panoramic view of the container terminal at the port

The port handles a variety of cargo including iron ore, coal, granite, fertilisers, petroleum products, containers, automobiles and several other types of general cargo items. As of 2011, cargo movement to the port is increasing by 21 per cent. Over 5,000 container trucks move through the port every day. However, the number of containers coming into the port has dropped by 30 per cent in the same year. In July 2012, a vessel traffic management system was installed at the port to track vessel movements for nearly 2 km, which can be extended to 48 nautical miles.
Due to the increase in container traffic, a second container terminal was planned and tender works given to PSA Sical. It has asked for support for a mega container terminal. The terminal would be the first deep-water terminal of its kind in India and would be able to handle ultra-large container ships of 13,000–15,000 TEUs capacity and length exceeding 400 m (1,300 ft). The management of the container terminal was taken over by P&O Ports of Australia. This has a volume growth of 20 per cent per year and has 59 per cent of the market share of South India. It has services to Singapore, Malaysia, Thailand, Myanmar, Sri Lanka, Korea, China, Mediterranean, Europe, Australia and the United States.

e) Strategic efforts in providing auxiliary functions

→ Meteorological Functions

The cyclone detection radar station of the Southern Regional Meteorological Centre is located at the Centenary Building, the administrative building of the port. It is located atop the building at a height of about 53 m above sea level in a dome weighing 18 tonnes. The radar scans the atmosphere within a radius of 500 km. The Port Meteorological Office also functions from the same building.

The India Meteorological Department (IMD) maintains Voluntary Observing Fleet (VOF) through the Port Meteorological Office comprising ships of Merchant Navy, Indian Navy and foreign agencies through which meteorological observations from the ocean area are collected on real-time basis for operational forecasting and climatological purpose.

→ Disease Control

The Port Health Organisation, Chennai, functioning under the Director General of Health Services, Ministry of Health and Family Welfare, Government of India, was established in 1946 with an objective of preventing entry of yellow fever and other quarantinable and communicable diseases from abroad. Mosquito control in the port area is being undertaken by two agencies, namely, the Chennai Port Trust and the Port Health Organisation. Anti-mosquito measures are undertaken by the Port Trust while the issuance of yellow fever certificates, ship deratting and overall supervision of mosquito control is undertaken by the Port Health Organisation.

→ Connectivity

Extra-port connectivity: The Ennore Manali Road Improvement Project (EMRIP) which connects Chennai Port-Ennore road is undertaken with the contribution of National Highways Authority of India, the Chennai Port Trust, Tamil Nadu government and Ennore Port Ltd. The project envisages improvement of a 30.1 kilometer (18.7 mi) road network in north Chennai that connects all the container freight station handling containers for Chennai port. An 18.3-kilometre (11.4 mi) long, 20-metre (66 ft) wide elevated road project, connecting the port with Maduravoyal is under construction.

Intra-port connectivity: The total port roads run to a length of 27.5 km with a minimum width of 6 m and a maximum width of 26 m. The port is served by the Chennai Beach railway terminus in the Chennai Suburban Railway Network of the Southern Railway, chiefly handling suburban trains on the Chennai Beach-Tambaram section of the Chennai Suburban Railway Network. The port is one among the major ports having terminal shunting yard and running its own railway operations inside the harbour.
Lines at Chennai Beach railway station serving the Chennai Port.

Source: www.chennaiport.gov.in

As part of the port development, internal railway lines are being augmented for the evacuation of containers from the port. Third and fourth railway lines are being developed by the Southern Railway to improve connectivity to the port and the rail share of container movement to 30 per cent from the current 7 percent. The rest will be moved by road.

Conclusion

In present times society is becoming more and more sensitized about environmental protection. This growing concern has also reached the ports sector, which has to comply with safety and environmental protection regulations in their facilities as in every other industry. If the port and its industry want to be competitive then a joint approach between the port and the rest of authorities and companies is required. Together they must generate the proper conditions for a sustainable development in economic, social and environmental areas since the future of a port and its industry depends on the correct relationship among these three areas. As part of environmental management of the port, an environmental assessment is required to analyse all aspects and impacts on the environment. With the results of the diagnosis, an Environmental Management Plan must be developed, setting out the actions and measures to be taken for their control, if possible with indicators to have an objective point of view. It is important that these measures be effective and cost efficient in order to contribute to self-regulation.

As ports create a huge part of the infrastructures in a territory, they must engage in strategic thinking about their future and plan their operations in a planned manner. Although the process of developing a strategic plan is very complex, involving technical, organisational and port policy analysis and decisions, the process will contribute to fully integrate the ports in the host community, being able to achieve sustainable growth and further development in the required areas.

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