

Chapter 2

LITERATURE REVIEW

2.1 General

Waterborne transport has been a vital component of the transport infrastructure all around the world. Many countries including Sri Lanka had a rich history of canal system, but this has perished with time. This chapter reviews the waterborne transport networks around the world, mainly in the Asian region. It also gives a comprehensive historical background of the canal network within the Colombo Metropolitan Region in Sri Lanka.

2.2 Water Transport Around the World

2.2.1 Bangladesh

Water transport is an integral component of Bangladesh's transport infrastructure. More than half of the country's total land area is within 10 kilometres of a navigable waterway. Around 6,000 kilometres of waterways are navigable out of a long network of 24,000 kilometres

rivers and canals covering the country. The system links the country with its neighbours, India, Myanmar and Nepal. Presently, the inland waterways are also used by the Indian vessels travelling from one region of India to another. The Navigable network length drops to 4,000 km during, the dry season due to low water depths. There are around 1,400 landing stations and 11 principal river ports along the inland waterways, which records its annual traffic of around 6 million tonnes and 68 million passengers. It is around 36% of the freight and 13% of all passenger transport in the country. It is estimated that one third of nation's traffic is moved by inland water transport vessels. The important ports in the country are Dhaka, Narayanganj and Khulna. (Economic & Social Commission for Asia and the Pacific, 1998; Ahamed, 1996).

2.2.2 China

China has a long history of extensive waterway network of rivers, lakes and canals where the Yangtze River system is by far the largest Inland Waterway. Excavation of the Grand Canal, by connecting river tributaries, was started in 480 BC. However, significant under funding in this sub sector has caused the infrastructure and floating equipment deteriorate badly, and reduced the navigable network from 172,000 km in 1960 to 148,400 km in 1970 and to 109,700 km in 1993. However among 109,700 km of the current navigable lengths of waterways 65,000 kms has a water depth more than 1 metre and the navigable length at night is only 36,000 km. (ESCAP, 1998).

The annual passenger traffic estimated in 1998, is nearly 100 million passengers and 10.2 billion passenger-kilometres, and freight traffic of 8500 million tonnes and 190 billion tonne-kilometres. (ESCAP, 1998).

2.2.3 India

The Inland waterways of India have played an important role in its transport system since ancient times. Three major waterways have been declared as National Waterways, the Ganges from Haldia to Allahabad, the Brahmaputra from Dhubri to Sadiya and the West Coast Canal from Kottapuram to Kollam. It is estimated that the total navigable length of waterways is 15,544 km out of which 5,700 kms is navigable by mechanized vessels. (ESCAP, 1998).

However, in recent times the importance of this mode of transport has declined considerably with the expansion of road and rail transport. The decline is also due to deforestation of hill ranges leading to erosion, accumulation of silt in rivers and failure to modernize the fleet to suit local conditions.

The transportation of goods in an organized form is confined to West Bengal, Assam, part of North Eastern region and Goa. The annual cargo moved by IWT in 2000 was 1.5 billion ton-km out of the total cargo market of 1000 billion ton-km. It is however a tiny modal share of only 0.15%. (ADB, 2002).

2.2.4 Lao People's Democratic Republic

Inland water transport has been the traditional means of transport in the Lao People's Democratic Republic. The Mekong River is the major waterway crossing the country from North to south. The river runs through the country to a length of 1,970 km out of which 1,865 km are presently navigable. It provides an important linkage with its neighbouring countries, Cambodia, China, Myanmar and Thailand, and also a vital transport mode for rural areas. (ESCAP, 1998).

Inland vessels transported over 604,000 tonnes of goods and 1.6 million passengers in 1997. Most cargo vessels employed were relatively small with only one fourth of them over 50 tonnes capacity and 99% of passenger boats could carry less than 50 people each. (ESCAP, 1998).

2.2.5 Thailand

Thailand has a good inland waterway system, which covers about one-third of the country's area and comprises about 1,600 km of navigable waterways. The major waterways used are the Chao Phraya, Tha Chin, Mekong and Bang Pakong Rivers and their tributaries. Chao Phraya with a navigable length of 352 km from Nakhon Sawan to the sea is by far the most important of these. (Panichgit, 2000).

The inland waterways are used mainly for bulk freight movement of construction materials and agricultural produce. The freight moved by inland waterways accounted 20.13 million tonnes in 1998, which represent 4.3% of the national freight volume.

Passenger transport is concentrated mainly in Bangkok and its outskirts. In earlier days, waterways used to be the principal means of transport until roads and rail replaced it. However, as Bangkok grew, the transport needs of the populace have increased and the land transport services have proved to be inadequate. Thus once overlooked and ignored IWT has been revived. Presently, Chao Phraya River, especially the section from 10th km to 70th km the distance of 60km, is a major traffic route for the people living in Bangkok and nearby. Approximately 400,000 commuters in Bangkok and neighbouring area travel by boat daily. Express boats provide services from Nonthaburi, north of Bangkok, and the southern part while; ferryboats provide service connecting both sides of the Chao Phraya. (Panichgit, 2000).

2.3 Historical Background of Canal System In CMR

A significant legacy left to Sri Lanka by the Portuguese, Dutch and British, with contributions from Sinhala kings, is a system of inland waterway along the west coast of the island from Kalpitiya , at the outlet to Puttalam Lagoon, in the north to Kalutara in the south. The waterway system did not develop beyond the coastal strip because of the rugged terrain, but some access to the interior was possible along the rivers interesting the system of canals, lagoons and estuaries.

There were three inland waterway systems in Sri Lanka, the Colombo Beira Lake, the Colombo-Puttalam Canal and the Colombo-Kalutara Waterway. The inland waterways along the western coastal belt was connected to the Port of Colombo via the man-made Beira Lake which was controlled by locks on a lake-harbour connection canal. (ESCAP, 1998).



University of Moratuwa, Sri Lanka
Electronic Theses & Dissertations
www.lib.mrt.ac.lk

In the times past, the system contributed to the economic development of the region. Its decline can be attributed to, firstly, the development of the railway, then the improvements in roads and road transport.

2.3.1 Northern CMR

According to Dutch Waterways in Sri Lanka (Hettiarachchi, 2002), the system of canals dates back to the time of King Vira Parakrama Bahu VIII of Kotte, in 15th century. The canals led to Negambo on the Western Coast of Sri Lanka, then a busy seaport where countries such as China, Burma, Rome and Greece traded with the rulers. The purpose of the original waterway was to transport the precious stones, pearls and spices; cloves, cardamoms, pepper, areca nuts and cinnamon to seafaring ships leaving from the port of Negambo.

The King originally cut the canal presently name Old Negambo Canal alias Dutch Canal, which was reconstructed by the Portuguese in 17th century, and the Dutch in the 18th century. This led to a disaster where, the Muthurajawela paddy fields were subjected to saline intrusion and triggered the end of paddy cultivation in the once fertile paddy fields. In the process sparking a rebellion against the King, which he could hardly suppress.

Having established Colombo as their capital, the Dutch tried to grow paddy in the Muthurajawela marshes, but found, as the kings had done before them, that changing tides inundated the fields with seawater. Therefore, around the 18th century they setup the structures, dams and water cuts which enhanced and developed the old system of waterways to siphon out salt water from the fields. The Ja-ela was constructed to deliver fresh water from Attanagalu Oya to flush out the salt from the soil. The expected results never came on top of military reverses at the hands of the British (De Silva S .H .C, 2002)

The British who followed the Dutch rule also pursued the Muthurajawela bogey and undertook the rehabilitation of the swamp. Garvin Hamilton, British Agent of Revenue and Commerce in 1802 started a new canal to the west of the Dutch canal. This canal was called Hamilton Canal and meant to link the Dutch canal by a series of parallel canals designed to drain the Muthurajawela. But what happened was the opposite as the high tide brought salinity not only from Negambo Lagoon but also from Kelani River. To cash in this privilege, a few entrepreneurs started making salt and the government had to prosecute villages that started the salt business. Hamilton canal then earned the epithet of "Hamilton's Folly" and the local names Moda Ela or Foolish canal. (De Silva S.H.C, 2002)

2.3.2 Central CMR

Colombo served as a small seaport between 9th and 16th century and was used by various ethnic groups; Arab, Indian, Persian and as well as Chinese. End of 1505 the Portuguese discovered the island and by 1518 they built a fortress in the area of present day Colombo. Later to protect themselves, they dug a trench to separate the fort from the mainland. Beira Lake was created in 1521, in an effort to repel the attacks of a local ruler. With the creation of the Lake, the city was protected on all sides, south and east by the Lake and north and west by the sea. Although locals were unsuccessful to take over the fort, they succeeded twice to drain the Lake using canals. St. Sebastian canal, which still exists today, is one of them (UDA, 1996).

Both Dutch and Portuguese used the potential of the Beira Lake in their battle strategies. The Portuguese used the Lake to transport their defence material and the Dutch used it to transport their soldiers and break through enemy lines. By 1815 the whole island came under the British rule with Colombo being the country's capital. In the first half of the 19th century Beira Lake was larger than it is today. It was used for boating related to work activities as well as leisure. Parties, Concerts, Theatres were common sites along the banks of Beira (De Silva L.B.M, 2003).

When the original port development was carried out in late 1800, there were only a mid stream berths in the port. The Beira Lake was then a necessity for the export of tea and rubber. The designers and the developers of the port created Beira by providing lock gates and spillway to keep the water at a level 6 ft. higher than the sea. The quay wall was constructed on one side to enables the barges or lighters to come along the sides. The tea and rubber were stored in ware houses along the banks and they were transferred into lighters and taken into the harbour through lock gates, which were then taken alongside

ships waiting cargo in mid stream berths. However with provision of alongside berths and container terminals in the Port, Beira Lake lost its purpose and the Port had no use of Beira. Beira was neglected and gradually the water became stagnated and dirty. Earlier an average of 50-60 barges of 80-100 Ton capacities passed through the locks daily. Every time a barge went through the lock to the harbour, a large volume of water was lost from Beira. The water lost as augmented by a pump that was installed at the St. Sebastian locks. This operation kept the water circulation and kept the Beira Lake clean (UDA, 1996).

It was a common sight to see flat bottom boats called 'Padda' boats to flow in Wellawatte-Kirillapone Canal carrying loads of salt, cinnamon, coconuts and timber. They were either punted or towed by men along the towpaths (Hettiarachchi, 2002). These towpaths have now been improved and widened by a project by the Sri Lanka Land Reclamation and Development Corporation (SLLRDC).



University of Moratuwa, Sri Lanka
Electronic Theses & Dissertations
www.lib.mrt.ac.lk

2.3.3 Southern CMR

Southern CMR holds the largest natural Lake in the country, Bolgoda Lake. During the Dutch period (1654 – 1796 AD), Bolgoda Lake was extensively used by the Dutch to ferry people and goods from the upper stream of Kalu Ganga, particularly, from Rathnapura District. The water way was use to transport heavy machinery to the rubber plantations on the banks and transport back the rubber produce to the Port of Colombo for export. It was also a utilized as a very popular mode of transport for timber from Sinharaja Forest areas, by log crafts. There are several islands on the lake, which were the resting places for thee log craftsmen floated from the upper reaches of the river leading to many timber mills of Moratuwa. During the British Period, Bolgoda Lake was a famous hunting ground and place of recreation for the British adventurers who were stationed in the Colombo city (Nishantha, 2001).

2.4 Present Status of the Canal Network In CMR

The canal network in the CMR has been neglected and stays as an unutilized transport infrastructure. None of the three ancient waterway systems have its continuity and the systems that exist can only function as individual systems at its present condition. None of the systems available function as a public or freight transport mode. Apart for some recreational activities in Bolgoda Lake area in the Southern CMR and the Hamilton Canal, Negambo Lagoon in Northern CMR these water bodies are not utilized for any other public activities.

The Hamilton canal in the Northern CMR though has its continuity is mainly used as a transit by fishermen embarking on deep-sea fishing. They also use it as a parking space for all kind of boats and for some recreational activities by nearby hotels. The Negambo Lagoon is used extensively for shallow water fishing and for water sports. The lakes and canals in the Central CMR mainly function as a flood controlling method within the city and other than that are treated as dumping grounds of sewer and garbage with majority being stagnated and polluted. The lakes and rivers in the Southern CMR still has its natural setting and many in the surrounding areas use the water body for fishing as their main income source.

Although it has been criticised that we tend to forget or overlook the scope and the uses of canal system today, the Sri Lanka Land Reclamation & Development Corporation is now involved in projects to restore and rehabilitate the canal system in the Colombo city and its suburbs with foreign funding. Majority of the work is completed with 44 kms of network being deepened, cleared and widened (Hettiarachchi, 2002).