



## Pamban Rail Bridge – A Historical Perspective

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**Abstract:** *Bridges are built to span physical obstacles for the purpose of providing way over the obstacle. Pamban Railway Bridge connects Rameswaram town on Pamban Island with mainland India. During 1600–1800, trade flourished between Pamban, Rameswaram and Sri Lanka by using large boats and small ships. The boat mail was the only train which connected India and Sri Lanka very closer. The Pamban Railway Bridge was opened to traffic on 24 February 1914 and it was the only link to Rameswaram till 1987. Though the cyclone of 1964 destroyed the bridge, within very short period the railway engineers renovated the bridge and continued the service. This paper makes an attempt to highlight the features of hundred year old historical Pamban Rail Bridge.*

**Keywords:** *Pamban, Cantilever bridge, Rameswaram, Sri Lanka, Boat mail.*

### INTRODUCTION

The Pamban rail bridge is the India's first cantilever bridge, connecting Rameswaram with the mainland India. It is the India's first sea bridge constructed in Tamil Nadu. The mainland end of the bridge is located at 9°16'56.70"N 79°11'20.1212"E to 9.2824167°N 79.188922556°E. This 2.06 km long Pamban Bridge is the second longest sea bridge in India after Bandra-worli sea link. It was constructed in a special manner to allow ships to pass under the bridge (Francis et al., 1988). It was opened on 25 February 1914 for facilitating rail connectivity to Rameswaram. The bridge was constructed with much difficulty as it was located in the world's highly corrosive habitat. It was able to withstand the 1964 cyclonic storm which devastated several areas. Within forty five days the railway engineers renovated the bridge and continued its service. History says that Vijaya Reghunatha Setupati (1710 -1720), the ruler of Marava Kingdom of Ramnad who made many additions to the temple in Rameswaram started the ferry service for comforts of pilgrims who frequently visited the temple. Another version says that the *Thalapathy* who was called as army general of the Thirumalai Naicker had constructed a causeway across the Pamban channel to provide connectivity to Rameswaram Island.

### Ramanathapuram

Ramanathapuram district has an area of 4123 km and it is bounded on the north by Sivaganga district, on the northeast by Pudukkottai district, on the east by the Palk Strait, on the south by the Gulf of Mannar, on the west by Thoothukudi district, and on the northwest by Virudhunagar district. The district contains the Pamban Bridge, an east-west chain of low islands and shallow reefs that extend between India and the island nation of Sri Lanka, and separate the Palk Strait from the Gulf of Mannar. In 1590, the Kingdom of Ramanathapuram was founded and it became a *zamindari* estate under the Permanent settlement of 1801. It was one of the largest estates in the Madras Presidency and it consisted of the southern and eastern part of

Madurai district. Historical reference says that Sethupathi became the protector of the Bridge in the eleventh century AD. Rajaraja, the Chola king made him as the head of the Marava community as he protected the pilgrims who visited Rameswaram temple. Later Sethupathi was officially recognized by the Nayak king of Madurai and had a healthy relationship with the ruler of Madurai and in return the Sethupathi recognized the sovereignty of the Nayak king over his lands. In the late seventeenth century, when Nayak power began to deteriorate, Ramnad chieftains declared their independence. In 1795, English East India Company took over direct control of Ramanathapuram and was annexed to Madras Presidency. In 1910, Ramanathapuram district was formed by clubbing portions from Madurai and Tirunelveli districts. Shri J.E. Bryant, I.C.S. was the first collector of Ramanathapuram. After 1947, the town became a part of Independent India (Francis *et al.*, 1988).

### **Rameswaram**

Rameswaram is a town and a second grade municipality in Ramanathapuram district. Firishta opines that during the South Indian campaign, Malik Kafur, the general of Alaudin Khilji, the ruler of Delhi Sultanate reached Rameswaram in spite of stiff resistance from the Pandya princes in the early 14 century. Originally Rameswaram was part of the mainland and due to heavy cyclone in 1480, an island emerged separating Rameswaram at the Palk Strait. Ramasubhaiya, the army general of Tirumalai Nayak constructed a causeway across the Pamban channel connecting Rameswaram Island. During the 15 century Ramanathapuram, Kamuthi and Rameswarwm were included in the Pandya country. In 1520, Vijayanagar Empire took over the rule of Rameswaram and in 1740-1754 the town was captured by Chanda Sahib. During the middle of the eighteenth century, Arcot Nawab and Mohammed Yusuf Khan repeatedly captured this place. Finally in 1795 the British took direct control over Rameswaram (Subramanian, 1980a).

### **Dhanushkodi**

Dhanushkodi is an abandoned town at the south eastern tip of Pamban island of the state of Tamil Nadu. It is situated to the south east of Pamban and is about eighteen miles west of Talaimannar in Sri Lanka. It shares the only land border between India and Sri Lanka which is one of the smallest in the world at forty five meters in length on a shoal in Palk Strait. This town was destroyed during 1964 (Subramanian, 1980b).

### **Rail link between Dhanushkodi and Colombo**

In the late 1870s, when the East India Company planned to establish rail link between Dhanushkodi and Colombo for expanding trade, the need for rail connectivity between the main land and Pamban Island was felt. They also had the plan to extend the railways over the Adam's bridge to Ceylon, thus linking up the Ceylon and Indian Railways to establish direct and unbroken link between the port of Colombo and India. A project proposal was presented in the British parliament towards the construction of a rail bridge from Mandapam to Pamban and from Dhanushkodi to Thalaimannar at an estimated cost of 299 lakhs of rupees after conducting a feasibility study. But the British parliament rejected the proposal on cost ground. However it granted Rs 70 lakhs for the building of Pamban Rail Bridge.

According to the chronicles of Kutch Gurjar Kshatriya community recorded in the book, Nanji Bapa Ni Nondh Pothi, the bridge was constructed by Mistri Manji Daya wegad , Lakhu Devji Vegad, Varjang Hirji and Ganji Narayan. The construction work was started in 1887 and finished in 1912. In 1902, South Indian Railway commenced the work of bridge construction, with the '*Khuva*' from the Kutch region of Gujarat as they had prior experience in excavation and erection with the Himalayan railways. The fabricated structures were transported from Britain and the work went on smoothly upto the Mandapam side ([http:// hindu.com / 2007](http://hindu.com/2007))

The cost of the bridge was estimated to be Rs. 70 lakhs including the cost of buying three vessels. Construction of the bridge was started in 1902 using fabricated materials from England. Using 2000 tons of steel and engaging about 200 men, the Karoji Kutz family from Gujarat undertook the works. During

construction of the bridge, large quantities of materials were lost due to severe cyclone and waves and many of the labourers died due to cholera. William Scherzer designed the bridge and the construction was executed by Head Wrightson & Co, UK. The Pamban Rail Bridge was inaugurated on 24 February 1914 by Lord Pentland, the then governor of Madras in the presence of Sir Robert Chalmers, the then governor of Sri Lanka and Mr. Nevile Priestly, MD of South Indian Railway (Centenary of Pamban Rail Bridge 2014).

The decision to build the bridge and to run a ferry service between Dhanushkodi and Talaimannar in Sri Lanka was taken on 25 November 1908 at a meeting attended by the then Governor of Madras, Sir Arthur Lawley, the then Governor of Ceylon, Sir Henry McCullum and the then President of the railway board, Trevredyn Wynne at Dhanushkodi. Ferry service was in practice through the 65.23 meter wide 'Pambar' in the Palk Strait. As the engineers wanted to have the rail link without obstructing the ferry service, the railways approached the German engineer, Scherzer who could design and build the 65.23 metre long rolling type lift span, which can open up when vessels pass. When its erection was over in 1913, the traffic in the bridge began on 24 February 1914 (Centenary of Pamban Rail Bridge, 2014).

### **The Boat Mail**

During the British period, India and Sri Lanka were under one administration. The Boat Mail was the only train which connected the two countries closer. In 1876 a plan was proposed for the construction of rail Bridge between Chennai and Colombo. From Dhanushkodi to Talaimannar there were two ships namely Irwin and Koshan put in to voyage. The duration on the voyage was one and half hours crossing thirty six kilometers. Among the two ships one was spar and the other one was functioning. The ship reached the port of Talaimannar and this ship was called as Boat Mail. It was functioned with steam engine. The capacity of the boat mail was 300 seats and consisted of twelve compartments and the tickets were printed in three languages, Tamil, English and Sinhalese. There was a separate compartment written as 'Buddhists Monks' only in Tamil and English languages. The transport between Chennai and Talaimannar was under the control of South Indian Railway. The passengers travelled from Chennai to Dhanushkodi by train and from Dhanushkodi to Talaimannar by ship and Talaimannar to Colombo by train. From 1915 the Boat Mail started from Egmore at Madras to Dhanushkodi through Pamban Bridge. The Boat Mail was called as Indo-Ceylon Express. The British people and the Anglo Indians travelled in the first class compartment while the Indians were permitted to travel only in the second and third class compartments and the cost of the third class ticket was fourteen rupees and fifteen paise.

### **Features of the Pamban Bridge**

The 2.057 km long bridge consists of 145 spans of 12.20meters and one navigational of 88 meters at 114<sup>th</sup> span from Mandapam side. The navigational lift span, Scherzer span was named after the designer engineer, William Scherzer. As Palk Straight was generally shallow with a depth of 1 to 1.5m, a channel was formed in 1854 by dredging up to a depth of 10m facilitating the passage of small ships. Hence to retain this facility, the necessity arose for a navigational span (Centenary of Pamban Rail Bridge, 2014).

### **The Cyclone of 1964**

The location of Pamban Bridge is a cyclone-prone high wind velocity zone. The bridge is on 143 piers and each of 100 tonnes weight and the centre span is 67 meter long. It has double leaf bascule section that opens up for ships. In December 1964, the bridge was attacked by the cyclonic storm, the girders made of both RCC and Steel were washed away and two piers were damaged while the span could withstand the cyclone. Geological survey of India indicated that southern part of Dhanushkodi sank by five meters in 1948 and 1949 due to vertical tectonic movement of land parallel to the coastline. Consequently a batch of land of about 0.5 km in width stretching 7 km from north to south submerged in the sea. On 17 December 1964 a depression formed at 5°N 92°E in South Andaman sea which intensified in to a cyclone on 19 December 1964. After 21 December 1964 this storm moved westwards, almost in a straight line with the speed of 400 to 550 km. On 22 December

1964 this cyclone crossed Vavunia in Sri Lanka and resulted in land fall at Dhanushkodi on the night of 22 and 23 December 1964. The six coach Pamban Dhanushkodi Passenger train (T.NO.653) left Pamban at 11.55pm on that fateful day with 110 passengers including a party of students and five members of the railway staff. Arunachalam Kumarasamy, the bridge inspector, piloted the train. The signal at Dhanushkodi outer went dead and the train stopped for a while. But the driver with the risk started the train. A giant 20 ft wave rose from the turbulent sea and smashed the train. According to the estimate, the wind velocity was 280 km per hour and tidal waves were seven meters high. Nearly 1800 people died and thirty five railway workers died in the cyclone. The entire town was marooned and Madras government declared Dhanushkodi as Ghost town which was unfit for living. The then Assistant Engineer R. Sreedharan, with his team of engineers restored the bridge within five months (Centenary of Pamban Rail Bridge 2014).



**Plate 1.** Pamban Rail bridge being repaired

### **Construction of New Bridge**

When the 'Unigauge' policy was adopted in 2006, it was proposed to construct a new bridge with broad gauge, but the idea was dropped as the cost estimated was 700 cores of rupees. But with the intervention of the then President of India, Dr. A.P.J. Abdul Kalam, native of Pamban island, the bridge was constructed to broad gauge with the help of experts from IIT, Chennai and structural engineers ( Centenary of Pamban Rail Bridge 2014). The train services were resumed on 12 August 2007. For running goods train, the bridge was again strengthened in 2009. Until 2007, the two leaves of the bridge were opened manually using levers by workers (The Hindu, 2014).

Rakesh Mishra, the then General Manager of Southern Railways opined that though the life determined of the Pamban bridge is another fifteen years, the bridge will last for several years further. The bridge is opened and closed with the help of twelve people. Though several ships came to pass this bridge, it is opened once in a week to keep its strength. The barge owned by the Kolkata based Titagarh Marine crashed in to the Pamban rail bridge after anchor failure on 13 January 2013. The Southern Railway filed a case in the Judicial Magistrate Court of Rameswaram demanding a compensation of one and a half crore rupees. The crash forced the suspension of train services from Mandapam to Rameswaram for a week. Railway teams from Chennai and Madurai, local fishermen and divers from Tuticorin have been roped to finish the repair work. (Dinamalar, 2013).

### **Celebrations of the Pamban Railway Bridge**

Dr. A.P.J. Abdul Kalam, the former President of India and a resident of Rameswaram inaugurated the centenary celebrations of the Pamban Railway Bridge. He said "Pamban Bridge is part of my life." When he

was young, he had travelled hundreds of times on the bridge and he took newspaper to the island for distribution. During the celebrations he released a book on “Marvels of South Indian Railway.” Rakesh Mishra, the then General Manager of Southern Railways said “Pamban Railway Bridge is the most important heritage structure” and “the bridge was an engineering marvel that had tolerated corrosion and a violent sea for over a century. At the time of the celebrations, the 65.23 meter long rolling central lift span has been given a fresh coat of paint and decorated with lights. It opens up like a pair of scissors to allow vessels to pass through under bridge. The southern railway had the centenary celebrations of Pamban Bridge at Chennai Egmore on 24 February 2014. The reason for holding the celebrations at Chennai Egmore was that from Chennai Egmore only the Boat Mail started its first journey and crossed the bridge (<http://hindu.com/2017>) Southern Railway also celebrated the Pamban Railway Bridge on 13 February 2014 by organizing a technical seminar at the headquarters office of Southern Railway and exhibited the Photographs at Madurai, Pamban and Chennai Egmore. On the same day a book was released which depicted the history of the Pamban Railway bridge, its technical features, the event of its inauguration, the destruction of 1964 cyclone and its restoration and the challenges faced during gauge conversion with rare photographs of heritage value. During the celebrations forty six retired/serving engineers associated with the maintenance of the Pamban Railway Bridge were invited and honoured. Dr. E. Sreedharan also inaugurated an exhibition of photographs held at Chennai Egmore railway station. He was an instrumental in restoring the bridge after the devastation of the cyclone in 1964 (The Times of India, 2014).



**Plate 2.** Pamban Rail Bridge near Rameswaram



**Plate 3.** Train crossing Pamban Rail Bridge



**Plate 4.** Boat crossing under Pamban Rail Bridge

### **Conclusion**

The century old Pamban Rail Bridge and the more than two kilometers long road bridge connecting the island with the main land have been brought under security cover to avert possible sabotage following terror attacks and bomb blasts in Hyderabad and other cities. Already the Railway police had been providing security under the bridge and on the track. Dr. A.P.J. Abdul Kalam played a vital role in preserving the bridge. This bridge is attractive and beautiful in nature. The high officials are trying to get the UNESCO world heritage status for the Pamban Bridge on the line of the three Mountain Railways of India, Darjeeling Himalayan Railway, the Nilgiri Mountain Railway and the Kalka–Shimla Railway.

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