

VERTICAL LIFT BRIDGE

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Abstract—A bridge is a structure that connects two transportation access points. A movable bridge allows for the passage of two separate modes of transportation through waterways and railways/roadways. The deck of the movable bridge can be moved vertically. When the deck is lifted it gives passage for boats and at rest gives passage for trains. In the southern portion of India, Pamban Bridge is the only movable bridge in India that connects Rameshwaram town with Pamban Island

Key Words: Pambam Bridge, Moveable Bridge,

which ensures the passing of ships underneath. They cost less to build for longer moveable spans. The counterweights in a vertical lift are only required to be greater than the weight of the deck. Thus heavier materials can be used in the deck, and so this type of bridge is especially suited for heavy railroad use. It is also more energy efficient, requiring comparatively less power to lift the bridge. The project is a prototype of such a bridge and utilizes a rope drive mechanism to lift the middle span of the bridge. Among mobile bridges, lift ones appear as the right answer when relatively long spans are needed. Bascule bridges or rotating ones are more limited, because of their overhanging decks. In France, the existing lift bridge with the longest span is —Recurrence. Bridge in Brest, with an 87.5-meter lifting span. But most large bridges of this kind are located in New Jersey, USA where many waterways allow maritime traffic. The longest lifting span in the world belongs to Arthur Kill Bridge with 170 meters, no longer in operation.

I. INTRODUCTION

A bridge is a structure constructed in a passage having obstacles such as a river; there are various types of bridges like suspension bridges, movable bridges, etc. We are studying Movable Bridge, In India there is only one movable bridge, it's the Pamban Bridge located in the southern part of India. The Pamban Bridge joins Rameshwaram town with the Pamban islands. The purpose of the bridge is to provide passage for trains and ships. The length of the bridge is 2.065 kilometres having 143 spans and a height of 24 m from the foundation. The movable span is 63m in length and width of 10 m. Pamban Bridge is a railway bridge constructed in the year 1914 by German Engineer Scherzer. Earlier, it was used by many pilgrims to travel through the bridge to the temple on Pamban Island. There are various types of movable bridges like vertical lift bridges, Bascule Bridge, and Table Bridge. A vertical-lift bridge or lift bridge is a type of movable bridge in which a span rises vertically while remaining parallel with the deck

II. OBJECTIVE OF INVESTIGATION

- To reduce maintenance costs.
- To reduce electricity.
- To provide waterways for ships and boats.
- To develop an inland water network.

III. PROBLEM STATEMENT

By conducting different examinations like railway survey and traffic analysis of boats and railways we concluded that the problem at Pamban bridge is due to its old bascule movable span which is insufficient for the vehicles to pass through the junction at different instants of time in a day which is affecting the free

flow of both traffic and improper movement of traffic also results in the occurrence of accident in different instants of time.



Fig . Lift Bridge

V. METHODOLOGY

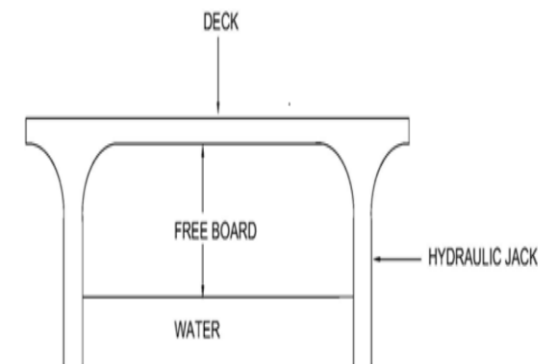


Fig 1. Span before lifting

The Figure will show the hydraulic jack used in lifting the movable span at rest position hydraulic jacks should be placed at the bottom of the two decks adjoining each other, and the space between them should be between 4 m to 6 m. This is the time when the train can pass over the deck of the bridge and the transportation of passengers and goods is possible and efficient.

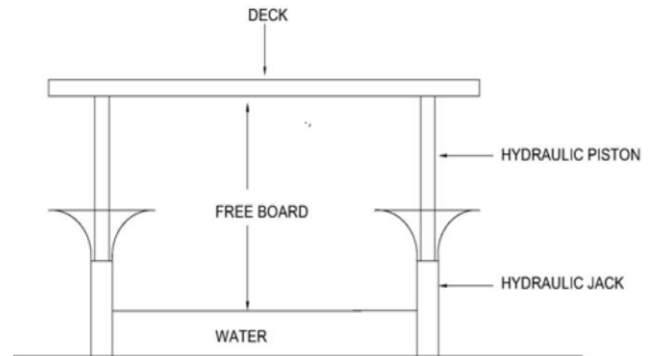


Fig 2.Span after bridge

Then when the barges and ships are to be passed across the bridge, the bridge can be lifted by applying external force to hydraulic pistons, and this will lift the bridge vertically in the upward direction and create a passage to the Barrages and Ships to cross the bridge. Figure 2 shows the Bridge after lifting with a high Free Board. This method can be used for the reconstruction of the Pamban Bridge located in Tamilnadu state of India the piers are designed as per Figure 2. Consisting of a hydraulic jack it

VI. HYDRAULIC JACK

A jack is a mechanical lifting device used to apply great forces or lift heavy loads. A mechanical jack employs a screw thread for lifting heavy equipment. A hydraulic jack uses hydraulic power. The most common form is a car jack, floor jack, or garage jack, which lifts vehicles so that maintenance can be performed. Jacks are usually rated for a maximum lifting capacity (for example, 1.5 tons or 3 tons). Industrial jacks can be rated for many tons of loads. For example, when a one-square-inch piston applies one pound of pressure to a hydraulic fluid, the

pressure provided to the fluid is equal to one pound per square inch. A ten square-inch piston connected to this system produces the force of one pound per square inch times ten or, ten pounds, according to Phys Link. However, when the smaller piston is forced ten inches in one direction, the larger piston will only be forced one inch in another direction.

VII. FUTURE SCOPE

- (1) The development of the railroads.
- (2) The development of our highway system.
- (3) The development of the marine transportation.

VIII. CONCLUSIONS

1. A vertical bridge that can be lifted with the hydraulic action is one of the best methods to create a passage for barrages and ships across the bridge due to this there are fewer possibilities of failure due to other movable actions such as Bascule Bridge.
2. Vertical bridge lifting requires less consumption of power than that of the conventional type of bridge.

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