

Mechanisms for new lifting railway bridge on Pamban Island, India

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Abstract

New Railway Pamban vertical lift bridge will replace the more than 100 years old strongly deteriorated Scherzer Rolling Bascule Bridge, connecting Pamban Island with the mainland of Tamil Nadu State, in India, promoted by RVNL, Rail Vikas Nigam Limited. The 77.5m lifting span weighs around 650 tons and can be raised 17m in approximately 3.5 minutes.

Mechanisms will be located at the top of the two towers, with a 250kW motor per side. Gear box set will reduce the motor 750rpm to 0.5rpm rotation speed of the 3m diameter sheaves, with the operation controlled by variable speed drives. Electrical supply is ensured by an 800 kVA compact substation and two 625kVA diesel generators as backup system. Lighting protection and an adequate earthing system is provided.

Keywords: movable bridge; lifting bridge; mechanism; gear box; metal casting.

1 Introduction

Pamban Island, in Tamil Nadu State, Southern India, has been connected to Mandapam in mainland by a single-track railway bridge since 1914, when a 2057 m long bridge was inaugurated [1]. The bridge included 145 spans 12.2m long, and a bascule Scherzer rolling bridge, allowing a navigational channel 57.2 m wide, manually operated. Having endured a sever cyclone in 1964 and the strengthening because of the broad gauge railway conversion in 2007, the bridge has been on duty until January 2023. The strongly deterioration state due to corrosion in one of the harshest environments in the world advised to stop the service, after several years of close monitoring.



Figure 1. Ancient Scherzer Pamban bridge

Rail Vikas Nigam Ltd (RVNL), promoted the replacement of the bridge by a vertical lift bridge, with a movable 77.5m long span, allowing for a clear navigational channel of 72.5m and 22m of vertical clearance. The vertical movement will take 3.5 minutes to raise 17m, planned to be operated