



Design & Construction of the Prai Swing Bridge

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Abstract

This paper highlights the design and construction of the Prai Swing Bridge, a key component of the 328km long Electrified Double-Track project between Ipoh and Padang Besar in Malaysia. The bridge was built under a design & build contract completed by MMC-Gamuda JV under the purview of Keretapi Tanah Melayu Berhad (KTMB). It represents a milestone in the upgrading of the railway infrastructure network within Malaysia as part of the national push for development.

Keywords: swing bridge, centre pivot, bridge lock, rail lock, vessel protection, hydraulic slewing cylinders

1 Introduction

The Prai Swing Bridge is an iconic bridge located within the 328 km long Electrified Double Track project from Ipoh – Padang Besar. The bridge was designed to replace the existing Single Track Swing Bridge with a new configuration of 2 x 45 m (total length = 90 m) steel swing spans with 192 m of approach structures consisting of prestressed T-beams. The new bridge was constructed to expand the rail network capability as well as to provide a larger waterway navigational channel and was commissioned in 2014. The overall layout is indicated in Figure 1.

2 Structural Form

The Swing Bridge is primarily a steel structure, with steel shaped sails forming the primary superstructure form supported by a steel deck. The sail shape was selected as an iconic aesthetic measure to blend in with the Prai River setting. The main swing spans consists of 2 X 45m spans which constitute the main waterway navigation channels. With a skew angle of 72°, the resultant waterway

navigation is 30m wide on both sides as per the requirement of the Prai Port Authority.

The centre pivot Pier P5 was designed as a hollow reinforced concrete column with the dual intention of housing the necessary machinery as well as to reduce the dead load onto the foundations. The pier design included special access provisions for future maintenance and replacement of the hydraulic machinery.



Figure 1. Prai Swing Bridge – Overall layout