

Penang Bridge Stay Cable Replacement

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Summary

Systra carried out the design of the replacement of the remaining 117 original stay cables on Penang Cable Stayed Bridge. This paper describes the design methodology for the replacement of stay cables and provides the key parameters for determining the schedule of stay cables final setting.

Keywords: Penang, bridge, structure, cable, stay, concrete, criteria, assessment, sequence, setting

1. Introduction

Penang Bridge is a vital crossing connecting Penang Island and mainland of Peninsular Malaysia. Construction of Penang Bridge started in 1982 and it was officially opened to traffic on Sept 14, 1985. The overall length of the bridge is approximately 13,5km. The main structure, a 440m long cable-stayed bridge, has a main span of 225m and side spans of 107,5m. The cross-section of the deck has two edge girders 1,75m high and 2,20m wide, spaced 27,5m centre to centre. They act compositely with the 25cm thick deck slab to form a cross-section with total width of 29,7m.

Each of the two edge girders is supported by a vertical plane of stay cables with a harp configuration. The main span is supported by 12 single cables and the back span is supported by 12 pairs of cables, with a total of 144 cables used to support the bridge deck. Some of the stay cables have been replaced due to large overstresses and bar breaks up to 2004. An additional assessment of the structure was carried out in 2005. As a result, in 2006, it was decided to replace the remaining 117 cables on the structure. SYSTRA has been commissioned by FREYSSINET to carry out the design of the replacement of stay cables on Penang Cable Stayed Bridge.

This paper summarizes the design criteria used in the detailed design, describes the design methodology for the replacement of stay cables and provides the key parameters for determining the schedule of stay cables final setting.

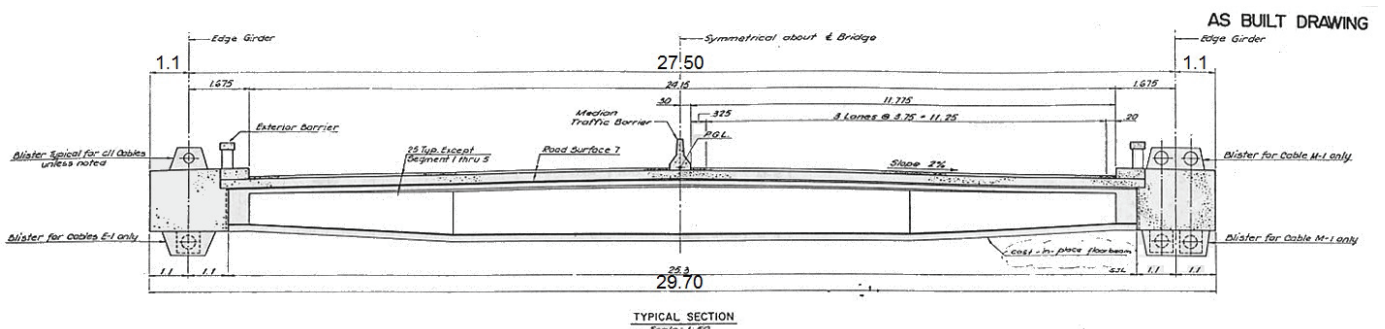


Fig. 1 – Typical cross section