Efficient and Economical Structural System in the form of Inverted-T Pier Crosshead and Deck Slab Continuity for Beam and Slab Bridges As Adopted in DUKE 2 Project in Malaysia

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Abstract

An elevated urban highway with beam and slab type bridges can be designed economically and efficiently by using inverted-T shaped pier crossheads and providing deck slab continuity over the pier crossheads. An Inverted-T pier crosshead which has its crosshead stem lies in between the superstructure beams can be used effectively to reduce the structural depth of superstructure and pier crosshead. This added with column height equivalent to the required minimum headroom clearance from the ground is what make the full height of the bridge. Thus, this type of crosshead can be used to lower down an elevated highway profile. While, simply supported beam and slab type superstructure with deck slab continuity can effectively share the longitudinal forces among the piers in a bridge module. This will lead to economical substructure and foundation design. These 2 aspects were considered in the design of DUKE 2 Highway in Malaysia.

Keywords: Inverted-T crosshead; crosshead ledge; minimum headroom clearance; link slab; deck slab continuity; elastomeric bearing; continuous longitudinal model; longitudinal force distribution

1 Introduction

DUKE 2 highway is an urban highway located in Kuala Lumpur, the Capital City of Malaysia. The DUKE 2 highway comprises 2 links namely Tun Razak Link (TRL) and Sri Damansara Link (SDL). MMSB Consult was appointed as design consultant for Tun Razak Link and design of this stretch was completed by the end of year 2014. The construction for this highway started in December 2014 and it was officially opened to traffic in September 2017.

The DUKE 2 Consortium was looking for an efficient and economical structural design with reduction in length for the elevated portion of the highway, optimum bridge spans, optimum bridge height and optimum sections for pier, pilecaps and piles. We achieved the objectives by using Inverted-T pier crossheads and beam and slab superstructure with deck slab continuity.

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