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Northeast Anthony Henday Drive / Yellowhead Trail Interchange Flyover Ramp Bridges

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Abstract

The three level system interchange connecting Northeast Anthony Henday Drive and Yellowhead Trail implement two flyover ramp bridges. To improve construction efficiencies, the contractor team sought implementation of continuous chorded (kinked) girders rather than conventionally curved girders to accommodate the curved ramp geometry. The multi-span structures comprised of kinked straight I-girders, forming horizontally curved alignments, imposed unique design challenges that were not explicitly addressed within the Canadian bridge code. This paper showcases the two flyover bridges; a 315 m long five span bridge with a radius of 340 m and a 415 m long six span bridge with a 347 m radius. Design challenges and considerations encountered during the design and construction are presented.

Keywords: kinked; chorded; segmentally curved; steel I-girders; straddle-bent.

1 Introduction

The extension of the Anthony Henday Drive from Manning Freeway to Whitemud Drive forms the northeast link completing Edmonton's free-flow ring road. Figure 1 illustrates the project extents of the northeast link in dark blue, with the pre-existing ring road portion shown in light purple.

Figure 1. Edmonton ring road

Northeast Anthony Henday Drive officially opened to traffic on October 1st 2016, forming the first completed free-flowing ring road in Canada. The project, awarded as a public private partnership (P3) to Capital City Link Group, consisted of nine interchanges with forty-seven bridge structures.

The two bridge structures discussed within are interchange flyover bridges 23.3 and 23.5. These bridges were constructed with straight plate I-girder segments arranged with a series of kinks forming continuous segmentally curved girder lines. Bearings on conventional abutments and intermediate substructures support the girders. The structures are shown on plan in figure 2.

Structure 23.3 is a 415 m long six span (48 to 92 m span lengths) flyover with a radius of 347 m. The bridge forms a S-E ramp connecting southbound Anthony Henday Drive to eastbound Yellowhead Trail with two traffic lanes on a 14.85 m wide deck.

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