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Longest Simple Span Steel Plate Girder Bridges in Florida – I-75 over SR 50 Twin Bridges

ABSTRACT

Throughout the nation, solutions to accommodate increased traffic and limited right-of-way have required innovative interchange configurations. These interchanges have posed many challenges in the development of structural solutions. This paper discusses the structural and construction solutions for the replacement of the I-75 bridges over SR 50 with new steel bridges to satisfy the geometry of a new Single Point Urban Interchange (SPUI) in Florida.

INTRODUCTION

The State of Florida is experiencing an increase in population and urbanization. Studies have estimated that Florida's population will grow to over 27 million by the year 2040¹. Local arterials and highways have seen an increased demand while available right-of-way has become scarce.

The Florida Department of Transportation (FDOT) has a master plan for the I-75 corridor, including the segment from Tampa to Florida Turnpike's junction. This plan intends to alleviate congestion by increasing infrastructure capacity to meet the anticipated demand, improve safety, and add mobility to the corridor. Along with the widening of existing roadways, interchanges are being replaced to satisfy operational and capacity needs. These new interchange configurations often require challenging structural solutions.

EXISTING INTERCHANGE: NEEDS AND DEFICIENCIES

The project interchange is located approximately 45-minutes north of downtown Tampa. The existing simple diamond interchange connects east-west traffic on SR 50 to the north-south I-75 corridor.

The existing I-75 infrastructure facility is elevated above SR 50 via 174 ft-long twin concrete bridges. Each bridge carries two 12' traffic lanes and two 8' shoulders. The SR 50 corridor includes two through-lanes and one turn-lane in each direction.

The substandard vertical clearance and the new SPUI geometry required the existing I-75 bridges to be replaced. The SR 50 corridor had a substandard roadway section that constrained truck turning radii and stopping sight distance at the signalized exit ramps, and a geometry that did not discourage wrong-way driving. The corridor did not meet the Florida Pedestrian and Bicycle Strategic Safety Plan².



Figure 1 – New I-75 bridges over SR 50

CORRIDOR GEOMETRY AND CONFIGURATION

The I-75 corridor will be widened from Tampa to Wildwood near the Florida's Turnpike junction to accommodate three lanes in each direction. The new I-75 corridor roadway incorporates provisions for future staged expansion to four general purpose lanes and one express lane in each direction, in addition to a flyover bridge from northbound I-75 to westbound SR 50. The SR 50 corridor will be widened to accommodate three through-lanes and two left turn-lanes in each direction, two buffered bicycle lanes, a sidewalk on the south, and a multi-