

Innovative Solutions to Seismic Design Challenges for the SFOBB I-80 WB Ramps at Yerba Buena Island

Hohsing Lee, P.E., S.E.

Regional Technical Director, AECOM, Sacramento, CA, US

Contact: hohsing.lee@aecom.com

Abstract

The I-80 Westbound (WB) ramps at Yerba Buena Island (YBI) are comprised of five complex curved structures that were designed to provide access to the new east-span of San Francisco Bay Bridge (SFOBB). The construction contract of the project was awarded in late 2013. Yerba Buena Island is located in very high seismic zone within the San Francisco Bay. Two major earthquake sources are the Hayward fault at about 12 km east of the project site and the San Andrea faults at 18 km west of the project site. The terrain at the bridge site highly varies with the ground surface elevations, which make seismic design very challenging. This paper discusses a number of innovative design solutions; foundation, superstructure, seismic deck joints, in-span hinges, spherical bearings, and etc. to deal with the stringent seismic design challenges.

Keywords: SFOBB; concrete-box; post-tensioning; steel-box; GFRC; seismic joints

1 Introduction

The City of San Francisco proposed to construct westbound (WB) on and off ramps at Yerba Buena Island (YBI) to and from the new east span of the San Francisco Oakland Bay Bridge (SFOBB). The new east span of SFOBB was recently completed via several construction contracts, which incorporated a number of structure segments. The YBI WB Ramp Project will interface directly with two of these structure segments (i.e., the “YBI Viaduct Replacement” and the “YBI Transition Structure”), which have been completed. The rendering of the YBI WB Ramp structures with the adjacent SFOBB structures is shown in Figure 1.

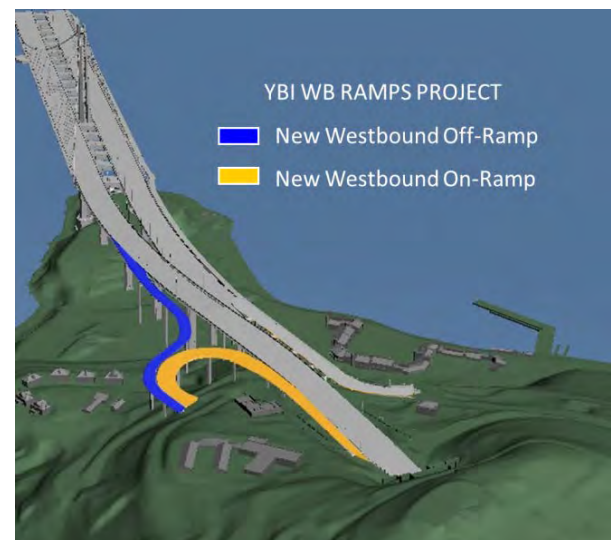


Figure.1: Rendering of YBI WB structures with adjacent new SFOBB structures