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Noise Challenges Addressed in the Construction of New East Span of the San Francisco-Oakland Bay Bridge

Abstract

On October 17, 1989, the Loma Prieta earthquake struck the San Francisco Bay Area measuring 6.9 on the Richter Scale. Beyond the immediate fatalities and injuries caused by this earthquake, it had a major impact on the transportation networks in the Bay Area, particularly with highway bridges and structures. The San Francisco-Oakland Bay Bridge (SFOBB) connecting these two cities on Interstate 80 suffered a collapse of the upper deck of its eastern span closing this primary artery for one month. In the wake of this disaster, the California Department of Transportation (Caltrans) took steps to seismically retrofit all of the Bay Area bridges and to incorporate more extensive seismic features in new bridge and structures projects. The largest and most visible of these projects is the replacement of the East Span of the SFOBB and the deconstruction of the old span. In 2013, the new span was completed and opened to traffic on Tuesday, September 3rd. Along with the engineering challenges of designing and constructing the largest self-anchored suspension bridge in the world, there were a number of environmental noise issues that had to be considered and addressed. Many of these issues concerned protecting endangered fish species and marine mammals from underwater construction noise primarily due to pile driving. Other issues included developing a new deck pavement texture to reduce tire/pavement noise, minimizing noise impact on US Coast Guard barracks located virtually under the bridge on Yerba Buena Island, and addressing noise and vibration concerns for historic structures located near the new bridge abutment. The final issue currently being addressed is the demolition of the old span, and in particular, the demolition of the large concrete piers that supported this structure. This presentation describes the engineering challenges of constructing a significant new bridge to meet the rigorous seismic safety standards, while addressing the complex noise challenges presented in this environment.

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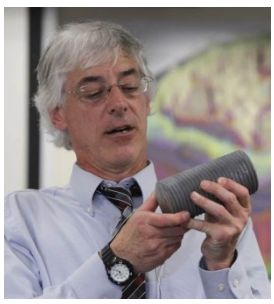

Dr. Brian H. Maroney is currently the Toll Bridge Program Chief Engineer for the California Department of Transportation (Caltrans) responsible for overseeing the design for the Toll Bridge Seismic Safety Program. In this position, he is responsible for the construction of the new East Span of the San Francisco-Oakland Bay Bridge. Dr. Maroney has over 25 years of experience in Bridge Design, Earthquake Engineering, Construction and Project Management. He earned his Doctorate from the University of California, Davis under Dr. Karl Romstad conducting research on the seismic response of bridge structures to earthquakes and particularly the behavior of bridge abutments. He is also an Adjunct Professor in the Civil & Environmental Engineering Department at the University of California, Davis where he enjoys working on bridge related projects. Dr. Maroney is also registered as a Civil PE in the State of California.