

ROOSEVELT – KIPAPA STREAM BRIDGE STRUCTURAL STRENGTHENING

OVERVIEW

The Hawaii Department of Transportation (HDOT) Highways Division, in a partnership with the Central Federal Lands Highway Division of the Federal Highway Administration granted funding for work on the Kipapa Stream Bridge, otherwise referred to as the Roosevelt Bridge. \$14.9 million was allocated to complete the project that will improve the structural capacity, seismic retrofit and travel surface of the bridge. The Kipapa bridge is located at mile point 14.4 on Kamehameha Highway between the highway’s intersection with Ka Uka Boulevard and its intersection with Lanikuhana Avenue. It is approximately 484 feet long, 34 feet wide and was originally constructed in 1933.

The Tyfo® system was used for the design by the DOT under section 577.02 calling for the fiber-reinforced polymer (FRP) system to be carbon fiber and conform to ACI 440.2R, Guide for the Design and Construction of Externally Bonded FRP System for Strengthening Concrete Structures and the AASHTO 2012 Guide Specification for Design of Bonded FRP System for Repair and Strengthening of Concrete Bridge Elements.

Dry fiber properties Tensile Strength – 580,000 PSI

Composite gross laminate properties of one layer tensile strength – 143,000 PSI

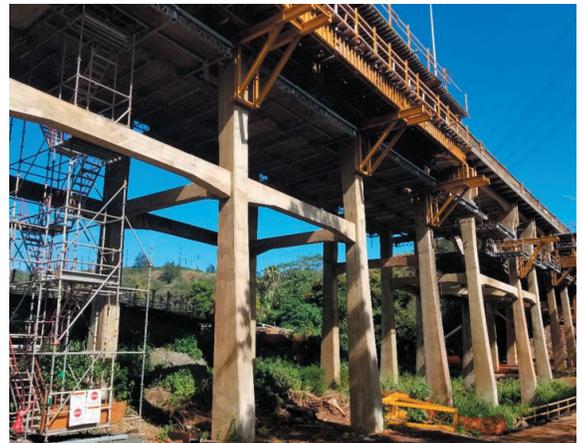
- The Tyfo® SCH-41 and Tyfo® SCH-41 2x was used for girder FRP strengthening, diagonal truss FRP strengthening, tie beam FRP strengthening, bent fascia FRP strengthening, including L and U wraps.

- 17,500 square feet of Tyfo® SCH-41 and 9,000 square feet of Tyfo® SCH-41-2x was used.

Design evaluation on the bridge was conducted and the determination made that using FRP on this bridge allowed only six short full closures as opposed to twenty day full closures. The price savings in material and labor was in the millions of dollars.



Kipapa Stream Bridge prior to construction



Kipapa Stream Bridge prior to construction

Project Overview	
Project	Roosevelt Bridge/Kipapa Stream Bridge Structural Strengthening
Location	Honolulu, Hawaii
Owner	HDOT - CFLHD
Contractor	Hawaii Dredging Construction Co