



PROJECT PROFILE

Bridge of the Americas

In-Depth Condition Assessment | Panama Canal, Panama



CLIENT

T. Y. Lin International

BACKGROUND

The Bridge of the Americas, completed in 1962, is a riveted tied-arch bridge that runs east to west and spans a mile and a half over the Panama Canal where it opens into the Bay of Panama in the Pacific Ocean.

WJE was retained to perform a condition evaluation of the concrete deck, in-depth vibration and fatigue analyses of the bridge superstructure, ultrasonic testing of the main hanger pins, and a condition survey of the coating covering the bridge steel.



SOLUTION

WJE engineers chain dragged the entire deck to locate delamination and corroded areas. Inspection openings were made at select locations in the deck for corrosion studies, and concrete cores were removed from the deck for petrographic and chemical analysis.



The engineers then installed strain and deflection gages to measure static strains and deflections due to a heavily loaded test truck and to temperature changes and also to obtain vibration data from the test truck driving over an obstacle. The suspension cables were tested to determine cable tensions, to capture vibration data for each suspension cable, and to measure frequency response spectra, which were found to correspond to each cable's characteristic frequencies of vibration. Using the spectrum data, WJE calculated suspension cable loads and presented recommendations for the repair and protection of the concrete deck.

WJE also examined the condition of the existing bridge coating (an oil-based primer pigmented with red lead and top coated with aluminum pigmented alkyd-based coating) and proposed a method of surface preparation and a recoating system.