



PROJECT BRIEF

Fred Hartman Bridge

Dynamic Assessment of Deck, Tower, and Cables

PROJECT PROFILE

CLIENT:
Texas Department of Transportation

LOCATION:
Houston, TX

VALUE:

- Establishing the overall dynamic baseline of the main span, tower, and stay cables to service for validation of performance after extreme events and remediations
- Estimation of forces and overall damping of stay cables
- Determining any unusual shapes of dynamic motion for further investigation

SERVICES PROVIDED:

- S-lynks wireless measurement and (OMA) system was deployed on main span, towers, and cables
- Data collection was completed without the need for external excitation
- Reporting was provided quickly

“Ambient movement of the bridge is measured quickly and more accurately than with any other system on the market to provide a critical understanding of the global behavior of the structure.”



S-LYNKS SOLUTION DEPLOYED AND OPERATIONAL MODAL ANALYSIS (OMA)

Geocomp deployed the S-lynks measurement and Operational Modal Analysis (OMA) solution to the main span, towers, and cables of the Fred Hartman Bridge. S-lynks is a passive and easy-to-deploy data collection solution with its wireless and extremely low noise structure as opposed to other monitoring methods, requiring external excitation.

Geocomp provided the data collection, processing, and reporting within a few days and without the need for excessive field work. The reported information included:

- Assessment of the resonant frequencies, associated damping and modal shapes of the vibration modes of the deck
- The baseline structural assessment of the main span, tower, and cables
- Cable tension estimation
- Comparison of measured tension vs. design tension and comparison of tension from symmetrically positioned cables
- Evaluation of the external dampers efficiency and performance



BACKGROUND

The Fred Hartman Bridge is a twin-deck cable-stayed bridge with a main span of 1,250 ft. and two adjacent spans of 479 ft. Each of the decks is 79 ft. wide and consists of precast concrete slabs on steel girders and floor beams. The decks are supported by a total of 192 cables, arranged in four inclined planes originated at each of the two double diamond shaped towers. The towers are 426 ft tall. The stays range from 194 to 646 ft. in length, with varying diameters. They are connected to the decks at 49 ft. intervals.