Manhattan Bridge, New York City, USA

osmos
Integrated safety for structures

The bridge serves both automobile traffic and railroad traffic.

Train passing

Monitoring a Bridge during Stiffening Work

Client

New York Department of Transportation
Weidlinger Consulting Enginners

Structure

Manhattan Bridge
New York City, USA

Context

Built between 1901 and 1912, Manhattan Bridge spans the East River. Its pylons, deck and cables are of steel. It serves both automobile traffic and railroad traffic.

The loads borne by the structure are quite frequently asymmetrical, due to train passings on one side or the other.

The client had observed visually perceptible movements between the suspension cables and the vertical truss members. A stiffening work campaign was therefore planned.

Client's Needs

The client was in need of an extended monitoring scheme with a view to:
a) establishing the structure's reference state; b) detecting any effects due the stiffening campaign itself; c) evaluating the campaign's effectiveness following its completion.

Instrumentation Installed

- 2 optical inclinometers
- 2 optical extensometers
- 1 temperature sensor
- 1 Monitoring Station

Initial Results

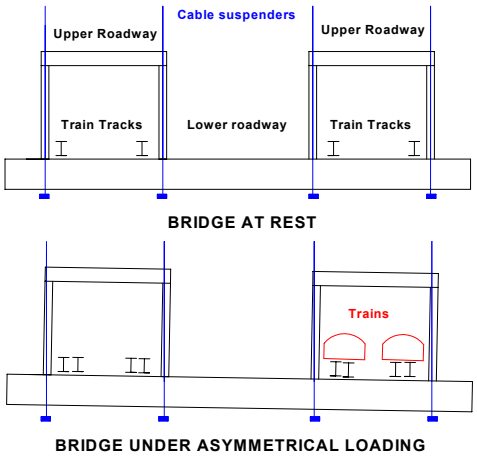
Both of the optical extensometers registered similar deformations. The main cause is apparently thermal variations.

Both of the optical inclinometers registered similar movements. This may indicate that the entire width of the deck behaves identically.

To date, all deformations have been reversible.

Client Benefits

OSMOS monitoring has supplied the client with reliable data establishing the structure's reference state. This in turn will allow swift detection and identification of any possible future departure from the structure's normal behavior. In addition, it will enable the client to evaluate the effectiveness of the stiffening campaign.



Inclination of deck under asymmetrical load

Monday 10/06/03 : 24 measurements

	Average	Standard Deviation
Deformation amplitude	55 µm	14 µm
Crest amplitude	9.5 µm	1.6 µm

Thursday 10/23/03 : 38 measurements

	Average	Standard Deviation
Deformation amplitude	51 µm	15 µm
Crest amplitude	9.5 µm	1.8 µm

Dynamic criteria construction and comparison for a long term monitoring

URBITRAN