ADIGE BRIDGE, TRENTO, ITALY

Ponte Adige. It is a new bridge (it was open for traffic on October, 2008) which allows a two-lane road to cross river Adige, few kilometers northward to Trento. It is a cable stayed bridge, with two symmetrical spans, each 130m long. Cables are supported by a single central 42m-tall pylon, erected on 4 columns. There are 6 cables on each span, and they are connected to the deck on both sides of the road, on 3 cross sections. The deck is made by a composite structure of steel and reinforced concrete. Where the cables are connected with the deck, steel box girders are arranged orthogonally to the road axis. Between consecutive box girders, 4 steel beams run in parallel along the road axis. Beams are connected by reinforced concrete slabs.

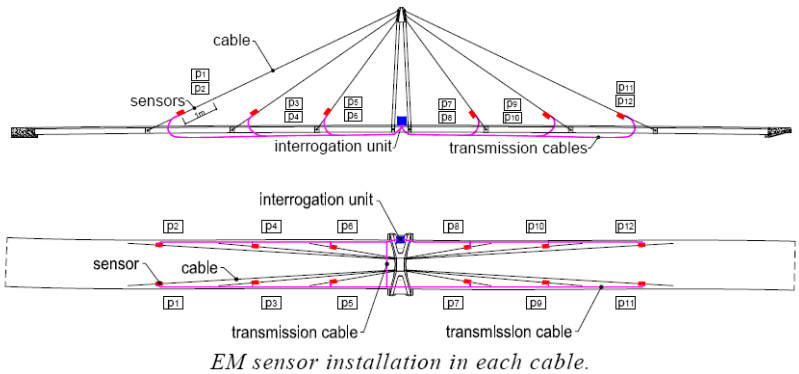
**Principles**

- To evaluate the safety level of the bridge, **both stress and strain on each cable** have to be measured. In facts, different types of defects or damages can affect the response of only one of these two physical quantities. As a consequence, an evaluation based on a single quantity would be poor, if it relied on arbitrary assumptions.

- Strain and stress are assumed as **uniform** on each cable, so that the measure taken on a single point is representative of the state of the whole cable.

- **12 EM sensors** are installed on each cable to measure the stress state of cables.

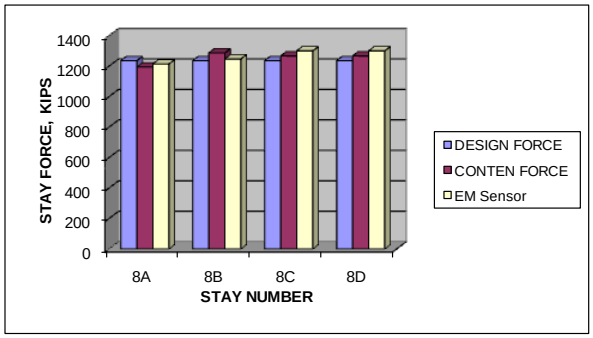
*Rendering of Adige Bridge*




*EM sensor installation in each cable.*

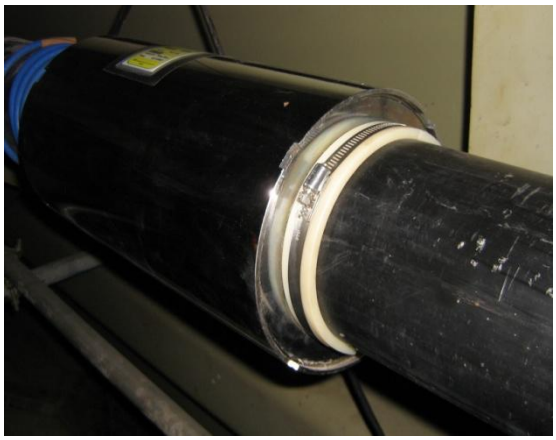
PENOBSCOT NARROWS BRIDGE AND OBSERVATORY, MAINE, USA

- The state of the art bridge in terms of latest technologies
- 80 stay cables
- Each anchor has 3 EM sensors
- Cable wire from EM sensor is secured inside box
- Stay force using EM sensors was monitored during construction



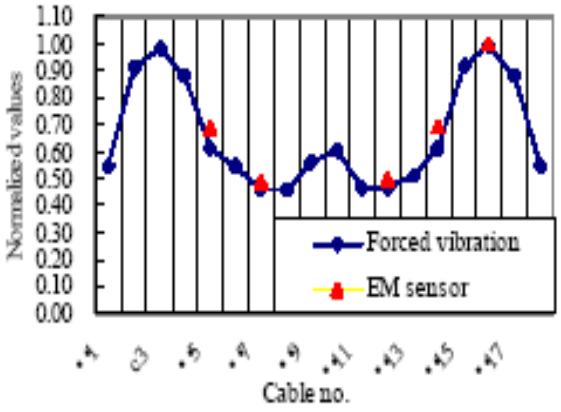
STONECUTTERS BRIDGE, HONG KONG, CHINA

- 32 sensors were installed at the interfaces of steel girders and reinforced concrete girders to monitor the force in 37-0.62 tendons



ASHIDAGAWA BRIDGE, JAPAN

- 18 EM sensors were installed.
- 3 different dia. cables with parallel wire
- Sensor forces were compared with forced vibration method



ZHANJIANG BAY BRIDGE, CHINA

- 16 EM sensors were installed.
- Sensors are over parallel strand bundle (max 199-1/4” dia.).
- Sensors are inside guide pipe.
- Date collects from remote area every 10 minutes.

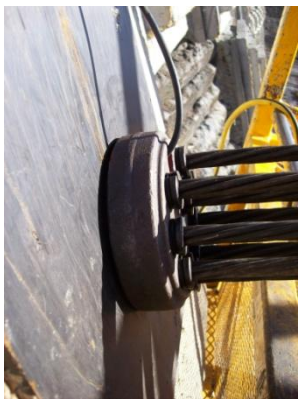
HSING-TUNG BRIDGE, TAIWAN

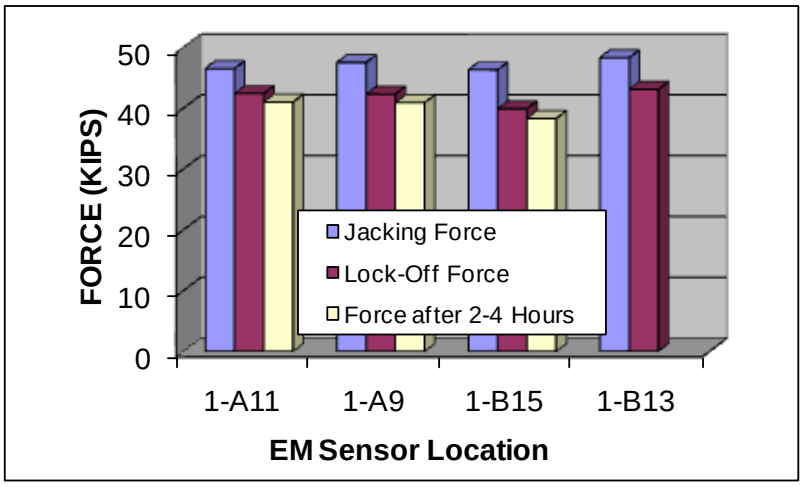
- Built in 1999
- 34 stay cables
- EM sensor fabricated in the field
- Monitor cable force

DRISCOLL BRIDGE FLOOR BEAM STRENGTHENING, NEW JURSEY, USA

- Force reading taken using EM sensor was equivalent to force in stressing jack


PATTON CREEK WALL STABILIZATION, BIRMINGHAM, ALABAMA, USA



TIE DOWN ANCHOR- BOUNDARY DAM, CANADA

- Sensors installed per anchor from top of the bond length at 0.2m, 6.2m, 12.2m.
  0.2m=load match gauge
  6.2m=load decreased
  12.2m=load was zero
- Bond length was reduced for rest of the tendons

BAR EM SENSOR IN TIE-DOWNS, CALTRANS