



## ABOUT Roosevelt Bridge

Industry: Civil

Location: Stuart, FL

The Roosevelt Bridge, located in Stuart, FL carries US 1 over its segmental box girder bridge across the St. Lucie River. The bridge was constructed in 1996 and is one mile long with two northbound and two southbound lanes.

# Wire Break Monitoring on the Roosevelt Bridge

## The Challenge

Given the number of residents that rely on the Roosevelt Bridge to transit the area, it is imperative that the bridge have an accurate and reliable structural health monitoring system to detect and prevent any failures or avoidable delays. To achieve this, Luna worked with Structural Monitoring Solutions (SMS), to integrate its innovative fiber optic sensing technology and deliver a rapidly deployable acoustic emission monitoring solution for detecting wirebreaks in critical areas.

## The Solution

Leveraging the designs from previous deployments, Luna and SMS installed an acoustic emissions monitoring system to monitor the post tensioned structure for wire breaks. The system consisted of two HYPERION instruments to monitor 128 optical accelerometers. Data was collected via edge computers and transmitted to the cloud for analysis via cellular communication. The accelerometers were mounted in strategic locations to better understand the health of the bridge and ensure the safety of travelers; the long-distance range of the HYPERION and fiber optic sensors simplified the deployment of sensors throughout the mile-long structure. Luna's innovative sensing design and SMS's deep technical knowledge of acoustics and structural monitoring were key to the success of this project.



“SMS could have chosen any systems provider, and after 30 years of experience in this industry, we chose Luna due to their willingness to engineer new methodologies and customize products, their deep domain knowledge of optical measurement technologies, and over 30 year proven track record. Their innovative staff was instrumental in custom designing hardware and software platforms for this program.”

– Terry Tamutus  
CEO, Structural Monitoring Solutions

## The Results

SMS installed the post tensioned wire break monitoring systems forty five days ahead of schedule with an ambitious deployment plan.

With two instruments installed, the serial deployment of optical accelerometers allowed for a substantial reduction in the number of instruments and associated hardware as compared to conventional technology. Twelve conventional systems would have been required to realize the 4,500 ft. of coverage required for this deployment, creating complex networking challenges. In addition, optical sensors have reduced data drift, as well as a longer sensor lifetime compared to electric gages.

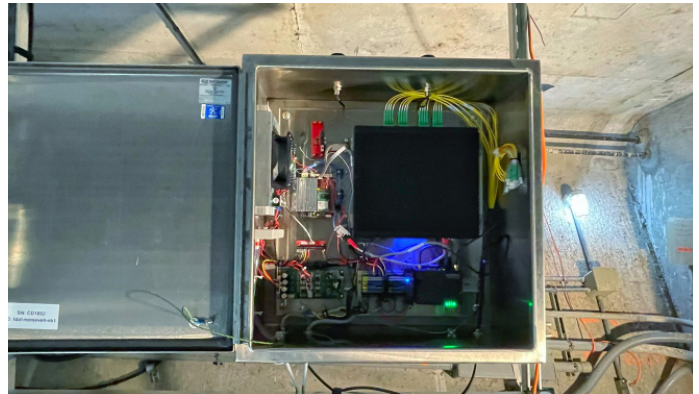
Luna’s sensing design was integrated alongside Structural Monitoring Solutions’ analysis package providing the customer with targeted reports that catalog and characterize any potential events.

Residents and travelers alike can feel safe when traversing the bridge with the 24/7 health monitoring giving the asset owner the highest fidelity inspection tool on the market today.



## EQUIPMENT USED

Luna’s HYPERION instrument and optical accelerometers were utilized in this innovative sensing design approach. Data is collected on edge computers that are connected to the respective HYPERION instruments, the data is transmitted to the cloud for analysis via cellular communication.



+1 540.769.8400  
solutions@lunainc.com  
www.lunainc.com  
www.smsshm.com