



Detecting Overweight Loads on Bridges

With Resensys Wireless Technology

Key Monitoring Capabilities

- Monitor and detect maximum recorded strain levels in load-bearing members due to overweight vehicles
- Detecting overweight vehicles and capturing visual evidence using solar-powered cameras.
- Real-time alerts and automated reporting for quick response.

The Importance of Detecting Overweight Loads on Bridges

Overweight vehicles can cause harm to the structural health of bridges. Thus, more attention should be paid to these types of live loads which may produce comparably high strain values.

Resensys's Unique Solution

Resensys offers a combination of two devices to monitor and detect instances of overweight loads (e.g., heavy truck, dump truck, etc.) on bridges. These two devices are the Wireless Strain Gauge SenSpot™ and the Wireless Solar-Powered Camera.



Wireless strain gauge SenSpot™ at a truss of a bridge



Resensys wireless solar powered camera installed on the pier of a bridge to provide complete visual feedbacks of overweight loads

Wireless Strain Gauge SenSpot™: This SenSpot™ continuously monitors and reports strain in load bearing members. Once the baseline reading is established, the maximum strain produced by legal loads is found using controlled test trucks. The estimated strain on load bearing members by the legal loads will be used as the threshold to screen for overweight loads and to detect potential load rating violations.

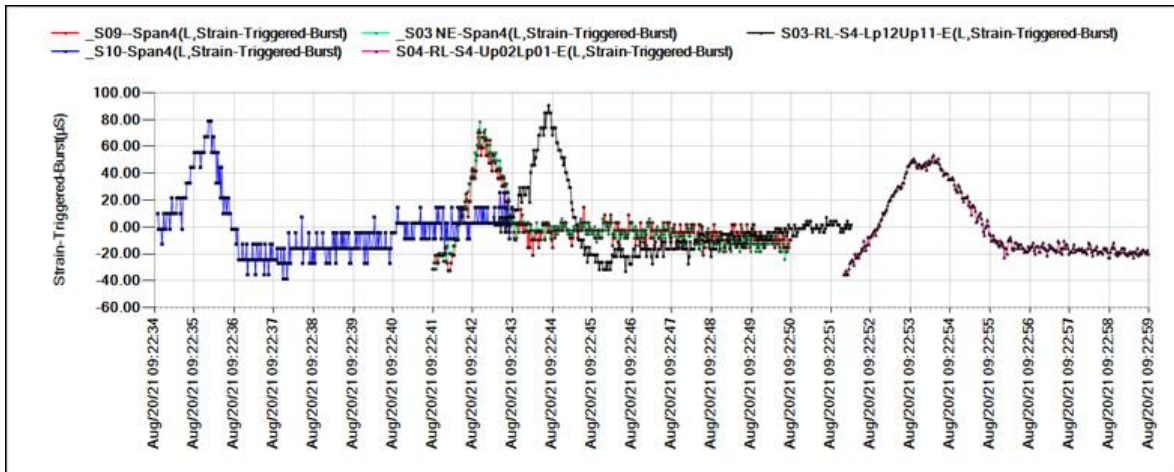
Wireless Solar-Powered Camera: The Wireless Solar-Powered Camera is used to take pictures after detecting loads which exceed the rated limits (source of overweight loads, e.g., heavy trucks). The camera is solar powered and it is not connected to any external source of electricity. The camera is powered off unless wireless strain gauges detect unusual strain at which point the camera takes a photo.



These are the photos of the overweight trucks captured by the camera on a highway bridge. The time tags from the camera match the time of the high strain events.

How Resensys System Works?

The wireless strain gauge SenSpot™ is designed to effectively pick up on overweight movements on a bridge. Once the wireless strain gauge SenSpot™ detects an overweight vehicle, this will trigger the wireless solar powered camera SeniMax™ to turn on a snap a photo of the overweight vehicle.



Graph of strain spikes detected on a few selected members on a truss bridge. Peak strain change is close to 100 microstrain.



The photo of the truck captured by the camera on a truss bridge. The time tag from the camera is 08/20/21at 09:22:40am, which matches the time of the high strain event.



A typical Resensys system for monitoring instances of overweight loads on bridges includes the following components:

- **[Wireless Strain Gauges SenSpot™](#)**: are attached on critical elements as determined by inspection, finite element modeling, load rating model or authority's/client's suggestion. The number of gauges required per structure is usually dependent upon the design, existing issues on members and project needs.
- **[SeniMax™](#)**: is a wireless data logger gateway that is connected to the cellular or satellite networks; it wirelessly collects SenSpot™ data at the site and sends it to a cloud database server (one SeniMax™ can cover as many as 100 SenSpot™ sensors and devices within its wireless communication range).
- **[Wireless Solar Powered Cameras](#)**: are installed on top of the piers or light posts to detect and capture the source/picture of overweight load/truck in high strain event. So, it is placed towards the locations/sides that vehicles come to the piers or light posts. Required number of cameras are determined according to project requirements. Camera can be integrated with SeniMax™. Thus, separate SeniMax™ is not needed for data acquisition.
- **[SenScope™](#)**: software for data analysis and visualization, data export, automated alert management, thermal analysis, and obtaining sources/pictures of overweight loads/trucks.

Resensys Benefits

- 10+ years Battery Life
- Easy to install & self-adhesive
- Small in size & lightweight
- Usable on different kinds of materials
- For short and long term monitoring
- No need for calibration in the field
- Quick Testing
- Rugged, weatherproof, & corrosion resistant
- High precision
- Lightweight design
- Immediate alert services
- Infrastructure less & energy self-sufficient system