Intercomp Weigh-in-Motion Strip Sensors increase accuracy and reliability at the busiest commercial land port in the United States

Background

Of the nearly $612 billion of imports and exports exchanged between Mexico and the U.S. in 2018, more than 37 percent of the traffic passed through the Laredo Port of Entry in Laredo, Texas via crossings of the Rio Grande River. Four bridges comprise the Laredo International Bridge System and connect the city with Nuevo Laredo and Tamaulipas, Mexico, permitting the passage of over 6.7 million vehicles annually.

The combined trade activity at three bridges in Laredo (two vehicular, one rail) ranks this city as the number-three customs district and the busiest land port in the United States.

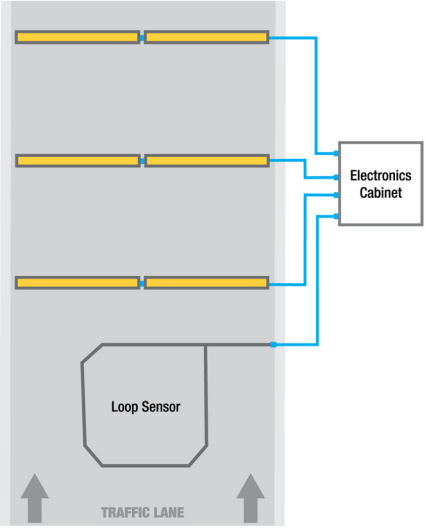
Reliability and accuracy is essential at the busiest land port in the U.S. in Laredo, TX, where all commercial traffic is monitored by an advanced WEIGH-IN-MOTION solution that automates weight validation and tolling.

PHOTO: U.S. Customs and Border Protection

Two of the port's four vehicular bridges are designated exclusively for commercial traffic — the World Trade International Bridge (Bridge IV) and the Laredo-Colombia Solidarity Bridge (Bridge III). Commercial vehicles traversing these bridges are required to pay a toll and are subject to compliance with established weight limits, classification and inspection — all designed to protect the road infrastructure and

public safety. Weight validation, enforcement screening and automated toll collection for vehicles traveling from the City of Laredo to Mexico have been handled by a WEIGH-IN-MOTION (WIM) system for almost 20 years. WIM systems allow vehicles to be weighed at speed, automatically.

Commercial vehicles detected to be overweight are alarmed on the supervisor's Real-Time Monitor, and the truck is intercepted and required to turn around on the departure side of the plaza. The truck is then directed to a static scale to confirm vehicle weight. The accuracy range of the WIM system is used to establish an overweight threshold relative to the legal gross vehicle weight of 80,000 lb (36,287 kg).



To meet the accuracy specified by TransCore, three pairs of Intercomp Strip Sensors were installed in each traffic lane.

Challenges

The original WIM system was an older, dual load-cell system with a TRMI treadle installed within the platform. Though strain gauge load-cells are known for their accuracy, the scales displayed other performance concerns. Unlike strip sensors, frame-based systems require digging up the roadway and the installation of a concrete vault, both to support the WIM scale frame and isolate the sensor from roadway rainwater collection. This style of system is inherently prone to water ingress, and requiring heavy equipment to remove the large WIM platform and its multiple components for frequent maintenance, resulting in significant maintenance costs, system downtime and lane closure delays.

Because of the issues associated with the existing system, the City of Laredo sought a solution that would allow for maximum uptime and system accuracy with less maintenance. TransCore, a leading transportation integrator, was selected for the project which consisted of a comprehensive upgrade to the toll collection system on two bridges — the commercial traffic-only Bridge IV World Trade Bridge and the non-commercial and commercial Bridge III Colombia Solidarity Bridge.

Strain Gauge-based Strip Sensors offer improved accuracies for Gross Vehicle Weights and Axle Weights versus piezoelectric sensors.

Solution

At the center of the new WIM solution, TransCore specified Intercomp Strip Sensors as the enhanced subsystem, because of their strain-gauge based accuracy, reliability, simplified installation and operation without frames and drains. Toll collection and overweight vehicle screening can occur simultaneously, and truckers no longer need to stop for inspection if their weights have not exceeded specified limits.

Installation is simplified with a loop sensor and flush-mounting the strip sensors into shallow cuts, reducing costs and operational disruptions.

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>
> César Garza Jr.
> Bridge Network Analyst
> City of Laredo, TX

The high-performance, strain gauge load cell technology of the Intercomp system operates over a wide range of environmental conditions and roadway surfaces. With its long-term stability and internal temperature compensation, the sensors deliver improved accuracy and consistency of output, day-to-day and season-to-season. Along with enhanced accuracy, the Intercomp Strip Sensor eliminated the maintenance challenges of the existing system. Johnny Redman, Transportation Accounts Manager at Intercomp, noted the sensors easily meet <5% error required by the customer. They deliver a low cost of ownership due to the stability of the sensors, and self-contained operation minimizes disruptions while vastly reducing installation costs associated with frame-based systems.

Results

Ron Barr, project manager at TransCore, stated, "We've had excellent results with the Intercomp Strip Sensor integrated into our WIM solutions. We installed three pairs of sensors in each lane for 15 lanes of traffic at multiple bridges." Barr noted that the strain gauge sensors deliver required performance with minimal maintenance. "We've experienced increased uptime of the vehicle lanes with the WIM systems, and a decrease in maintenance operations and the costs associated with them."

"The Intercomp solution that TransCore recommended was extremely attractive to us because of the improved accuracy and low maintenance demands," said César Garza Jr., Bridge Network Analyst for the City of Laredo, TX. "This system has performed flawlessly since its installation in 2017 and requires no maintenance other than calibration just once per year. It certainly has provided the uptime and reliability we needed."

Garza Jr. added, "The ease of installation and reduced overall costs allowed us to install redundant strip sensors that provide increased sampling rates and fault tolerance. The accuracy has been a 10X improvement over the prior system."

Intercomp Technology Overview

Designed from NTEP/OIML approved scale technology, Intercomp Strip Sensors measure the magnitude of mechanical quantities such as force, torque, load and pressure to provide the system requirements specified with precision scale technology. This turnkey solution enables compliance with accepted metrology, standarization, testing, certification and accreditation used by legal metrology authorities and industries worldwide. Intercomp Strip Sensors are

capable of meeting or exceeding ASTM E1318-09 Type III and COST 323 A(5) performance requirements, and certified to the OIML R134 WEIGH-IN-MOTION standard.

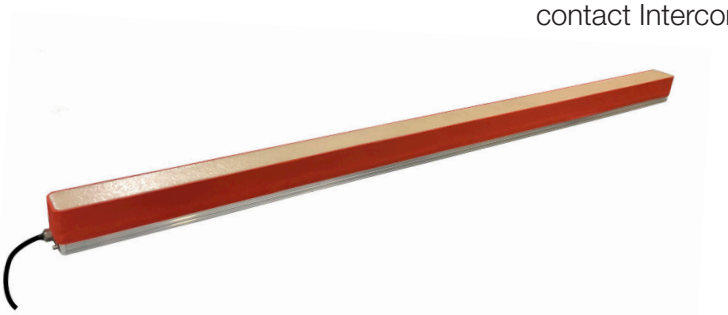
WIM systems driven by Intercomp Strip Sensors can automatically record and display wheel-load weights, axle weights, gross vehicle weights and other parameters as needed, at a wide range of speeds. Violation codes and definitions can be customized by the user, enabling streamlined screening of traffic. The system is well suited for weight enforcement screening, direct enforcement, monitoring bridge loads, traffic data collection and conducting road research.

Intercomp Strip Sensors are available in three standard lengths of 59", 69" and 79" (1.5m, 1.75m, and 2m). Custom lengths are also available. Installation consists of 1–4 pairs (2–8 strips) per lane.

Learn more about Intercomp WIM Strip Sensors

Used for tolling and various other Low- and High-Speed WIM applications, Intercomp WIM Strip Sensors combine the best attributes of a precision strain gauge-based scale and the robust form factor of an in-road strip sensor.

More information is available at **intercompcompany.com**, or contact Intercomp directly for application assistance.



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