Advances in WIM technology enable efficient, cost-effective enforcement

Today's roadway authorities leverage multiple tools and facilities for weigh-in-motion (WIM) enforcement. Ranging from mainline screening and preselection, to incorporating virtual WIM (V-WIM) locations and software, to using static or portable weigh stations, a myriad of options exist to meet local regulations and requirements.

WIM systems appeal to both authorities and transporters because they minimize the disruptions associated with the static weighing of vehicles. However, static weighing is acknowledged to be the most accurate way to weigh vehicles for citations and enforcement. This has led agencies to develop strategies that employ high-speed WIM (HS-WIM) for screening for probable offenders, and low-speed WIM (LS-WIM) and static scales for measuring highly accurate axle and gross vehicle weights.

Strain gauge load cell-based technology has been widely accepted as the most accurate and reliable means to weigh a vehicle. As such, this technology is widespread in static platform scale and LS-WIM scale systems.

Minnesota-based Intercomp Company has developed this strain gauge technology to work within HS-WIM applications, and has further leveraged its 35 years of experience with portable scales to enhance the user experience for portable LS-WIM and static scales for enforcement.

Reliability and opportunity

The HS-WIM strain gauge strip sensors are installed in a 3in-wide (75mm) channel cut into asphalt or concrete roadways, and can be installed in a single day. With the inherent performance and durability of strain gauge load cells, the sensors are capable of meeting performance requirements for ASTM E1318-09 Type III, or COST 323 A(5) methods. Stability, performance and durability of the sensors in a variety of adverse weather conditions and roadway conditions allows for a wide range of applications and an excellent ROI for users.

These sensors can be paired in existing WIM sites, or within V-WIM systems coupled with cameras and software for vehicle classification, measuring axle weights, axle spacing and gross vehicle weights. Automatic license plate recognition, optical character recognition, and scene view data is matched to WIM data and then transferred to the CPU to be processed further. Data and images can then be flagged for potential violations, and accessed via the web from remote locations for downstream enforcement.

Need to know

Strain gauge load cell technology optimizes performance and reliability in HS-WIM

- Intercomp's WIM strip scales can be configured in sets of one, two or three pairs of strips depending on the application
- The sensors can weigh highway vehicles traveling at speeds of up to 80mph (130km/h)
- The system is well suited for weight enforcement screening, monitoring bridge loads, toll roads, traffic data collection and conducting road research

Portable weigh stations

Once a vehicle is flagged for potential violations, it is typically diverted to a temporary or permanent weigh station. Due to the costs associated with construction and operation of permanent weigh stations, temporary stations offer roadway authorities cost-saving options. Portable WIM or static scales provide the tools for agencies to be more flexible with budgets and locations for enforcement.

When placed at temporary weigh stations, portable WIM or static scales enable axle and gross vehicle weight measurements for ticketing violations. Intercomp has several portable scale options using strain gauge technology, with multiple features developed to meet user needs.

(Left) **Portable LS630 WIM scale** (Above) **Intercomp's WIM strip sensor**

Portable scales have grown smaller over time, in scale weight and profile height, enabling easier deployment by agency officials and usability for operators. With the integration of wireless weighing technology into the scales, increased safety and convenience is also realized for the operator. One doesn't have to walk around the scales and record the data during weighing operations, as the data can be wirelessly sent to one of several available hardware or software tools. Static vehicle weights can be measured in the same way if the application requires it.

This range of fixed and portable WIM systems provides accuracy, functionality and flexibility in a comprehensive set of enforcement solutions with excellent ROI. Each WIM application presents a unique set of circumstances and customer requirements, but one can configure systems to meet specific application needs. ○

by **Larry Yermack**

Connected vehicles should be a part of an integrated transportation network

"We have dreamed of vehicles that could drive themselves for a long time. GM led the way at the 1939 World's Fair with its Futurama exhibit, which presented a futuristic vision of automated vehicles. Then, in 1958 Disney got into the game with an animation called Magic Highway USA. Disney's cars rode on highways with enormous variable message signs and ice-melting coils, and the cars were programmable. You can watch the Disney video here… trafficTechnologytoday.com/disney

In the 1990s we had the Automated Highway Consortium where, for the first time, car companies cooperated to develop a national network of autonomous vehicles. There was a press event in San Diego where this experiment ended. It depended on millions of magnets being installed nationwide, so the idea never went beyond demonstration, but that cooperation between the car companies and the government led to the connected vehicles of today.

With the advance notice of proposed rule-making from the NHTSA, we are on the verge of realizing cars with built-in DSRC radios by 2020. These connected vehicles will be able to share information across a network and support active safety. This will give us cars that are much less likely to crash. As a side note, this may be the first time that the automotive industry is promoting safety innovation rather than fighting it. Its track record to this point had not been impressive.

The promised connected vehicles will not only communicate each other, but also with the roadside infrastructure (V2I). Here is where the model is inadequate. Active safety depends upon vehicle-to-vehicle (V2V) communications, but the additional V2I functionality depends on the installation of additional roadside infrastructure and there are no funded plans for this. The hope is that the promise and demonstrations of that functionality will lead to investment. I believe we need to think more broadly.

"While the USDOT has many ideas for V2V applications, it doesn't have funding"

While the USDOT has many ideas for V2V applications, it doesn't have funding. States are constrained these days, so will need a commercial application to attract private investment. The problem is that little thought or attention is being paid to the necessary commercial content. It's sort of 'if we build it, they will come'. Let me suggest that we need to think about it now, so that someone can build it soon.

For me, the 'it' is a payment system built on to the transponder active safety system. Let's use the DSRC network for what people love to do – shop. But in this case let the shopping be inside the transportation network for the rest of the trip. Drivers are not just drivers; they are travelers and will park their car, take a train or bus, order a car service, or perhaps even rent a bicycle. If we can provide complete journey planning as well as ticketing, we can have a complete personal transportation system. Now that might be something to attract investment interest.

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