

Vehicle Weighing

Industrial Weighing and Measuring



Certification is Not Enough Save Money with High Accuracy

Weights-and-measures (W&M) regulations exist to protect customers from being cheated. They ensure that only small weighing errors are allowed for individual transactions. If your business weighs a large number of trucks, those small errors can add up to big losses.

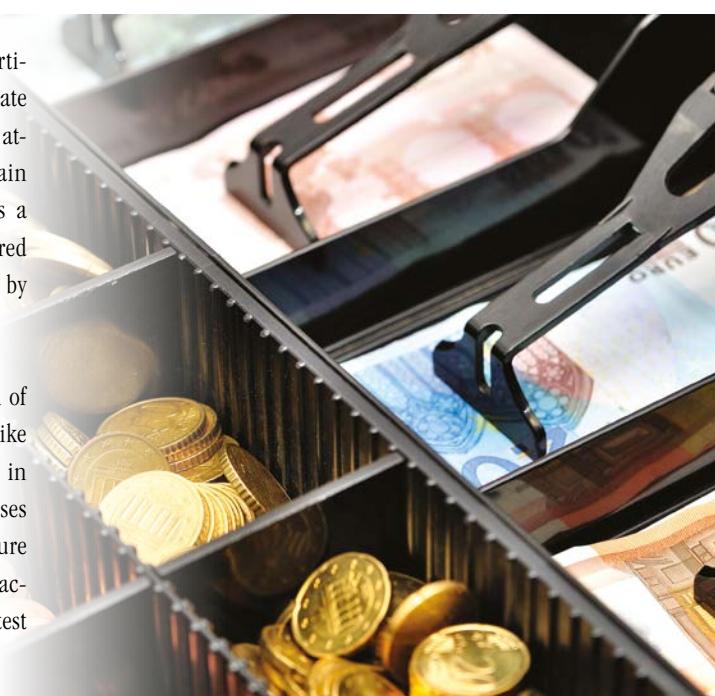
No business would tolerate a cash register that repeatedly rings up the wrong price. The faulty equipment would be fixed or replaced immediately. Then why are so many businesses willing to put up with a truck scale that shortchanges them? Either they do not realize how much money the problem costs them or they do not think there is an alternative.

Most owners of legal-for-trade scales assume that regularly scheduled certifications ensure weighing accuracy. The local W&M authority checks each scale, making sure that it weighs within legal tolerance. Certification is the customer's assurance that a scale provides reasonably honest weights.

Allowable errors

It is important to understand that a certified scale is not necessarily an accurate scale. Perfect accuracy is difficult to attain, so W&M authorities allow a certain amount of error. A scale that weighs a load of 20 tons can still be considered legal when its weight readings are off by 80 pounds or 40 kilograms.

Should you be satisfied with that level of accuracy? Perhaps the error sounds like something you can live with. Keep in mind that the allowable error increases when heavier loads are weighed. Figure 1 shows how much the error on an actual analog truck scale increased as test weight was added.



METTLER TOLEDO

The cost of errors

Does the error still seem manageable? Then consider how many trucks you weigh during a typical day. The error will be repeated for every truck that crosses your scale. Now multiply the cumulative error by the cost of the product that you weigh. The annual losses can be staggering (see Figure 2).

Of course, chances are only fifty-fifty that your scale will shortchange you by displaying low weights. The errors could be high. Instead of losing money, you would be charging customers too much for a product. While that might not sound like much of a problem, it can become one.

Ask yourself how long you would continue to shop at a store where the cash register routinely overcharges you. Your customers are just as concerned about being shortchanged as you are. Customers can and do question weights. If they are not satisfied, there is a good chance that they will look for another supplier. In the long run, a scale that alienates customers can cost you as much money as one that displays low weights.

Fines and delays

Even if you do not operate a legal-for-trade scale, weighing errors can cause trouble. Accuracy is equally important for scales that are used to ensure compliance with highway weight regulations. Your scale could be giving you a false sense

of security by telling you that overweight trucks are in compliance. If you are trying to maximize loads, even small weighing errors can put you at risk of large fines and lengthy delays.

How big is the risk?

It depends on what type of weighing technology you use. Many of the truck scales being sold today are equipped with some type of analog load cells. Analog weighing technology has not changed much in the past half century and neither has its limitations.

An effective solution

What is the alternative? By using advanced digital technology, POWERCELL®

load cells deliver the highest accuracy and the greatest value. To verify this claim, METTLER TOLEDO recently compiled accuracy data from more than 2,700 calibration tests. Both analog and POWERCELL® scales were tested at standard calibration test loads of 20,000 to 25,000 pounds (9,072 to 11,340 kilograms).

On average, analog scales produced errors that were three times larger than POWERCELL® scales. The difference in accuracy is magnified when trucks are loaded to capacity. Recent full-load calibration tests were performed on analog and POWERCELL® scales to demonstrate this problem. They showed how analog er-

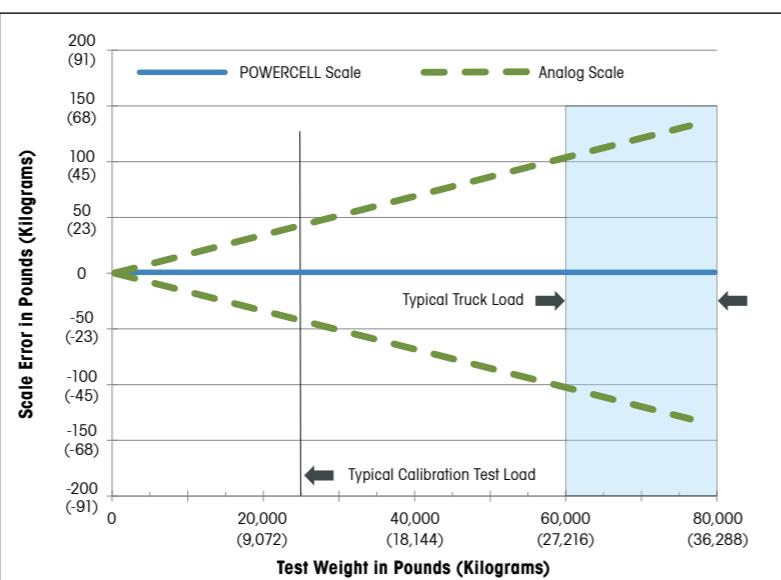


Figure 1: Accuracy Comparison

Accuracy data from actual POWERCELL® and analog scales show how the analog errors increased when test weights up to 40 tons were applied.



Cost of Product*	0.075 per lb	0.15 per kg
Scale Error	-80 lb	-40 kg
Trucks per Day	100	
Daily Loss*	600	
Annual Loss*	158,400 (264 days per year)	

Figure 2: Cost of Weighing Errors

*US Dollars, Euros, or other local currency.

rors significantly increased as the weight of the load increased.

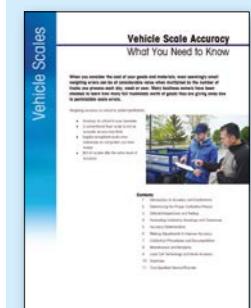
With the welfare of your business at stake, you need to have confidence in the accuracy of your truck scale. Real-world data shows that POWERCELL® technology has a much greater probability of delivering

a high level of weighing accuracy. With other technologies, accuracy is often a matter of luck.

Stop shortchanging your business. Find out how POWERCELL® technology can increase your weighing accuracy and profits.

► www.mt.com/powercell-ve

Is Your Truck Scale Accurate?



Don't take your truck scale's accuracy for granted. Protect your profits by learning what you can do to ensure a level of weighing accuracy that will prevent you from losing money every time you weigh a truckload of goods.

Find out more by downloading the free Vehicle Scale Accuracy white paper.

► www.mt.com/veh-wp-accuracy-ve

The Economical Way to Boost Accuracy and Profits

Until now, anyone looking for a competitively priced vehicle scale was forced to sacrifice accuracy. Low-cost analog load cells simply do not ensure the weighing accuracy needed to manage your costs. A new load cell changes the rules by providing high weighing accuracy at an economical price.

POWERCELL® GDD® load cells use the same POWERCELL® technology that has set the standard for accuracy in vehicle weighing. The load cells have digital capabilities that make it easy to fine tune a vehicle scale to a high level of accuracy. To maintain that accuracy, a microprocessor inside each load cell compensates for environmental factors that can cause weighing errors in conventional load cells.



The POWERCELL® GDD® load cell uses the same digital technology as the industry's most accurate load cell.

Real-time data

Unlike analog systems, these new load cells are active devices that produce more than just weight signals. Each load cell transmits real-time performance data. By constantly monitoring the data, an advanced scale terminal can alert the operator if an individual load cell deviates from standard performance levels.

Verified performance

Another advantage over analog systems is that POWERCELL® GDD® load cells have diagnostic capabilities. The load cells transmit performance data to take the guesswork out of scale service. Techni-

cians can access this data onsite or from a remote location, using it to verify a scale's performance and diagnose the cause of a problem.

While the new POWERCELL® GDD® load cells share the accuracy benefits of POWERCELL® PDX® load cells, they require a different type of network. A POWERCELL® GDD® network uses digital junction boxes to combine the load-cell signals. The digital junction boxes are an improvement over analog junction boxes. They increase reliability by reducing the potential for water damage, a big problem for analog junction boxes that must be opened frequently for recalibration.

Like most analog cables, the POWERCELL® GDD® load cell's cable is permanently attached; however, it is protected from damage by a thick layer of braided stainless steel. The load cell also has built-in lightning protection that analog load cells cannot match.

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POWERCELL® PDX® Load Cell



- High Accuracy
- Digital Compensation
- Highest Reliability
- Predictive Diagnostics
- No Junction Boxes
- Armored Quick-Connect Cable
- Lightning Protection >80,000 A

POWERCELL® GDD® Load Cell



- High Accuracy
- Digital Compensation
- High Reliability
- Basic Diagnostics
- Digital Junction Boxes (no need to open for adjustment)
- Armored Integral Cable
- Lightning Protection >29,000 A

Analog Load Cell



- Low Accuracy
- No Compensation
- Low Reliability
- No Diagnostics
- Analog Junction Boxes (must be opened for shift adjustment)
- Integral Cable (not armored)
- No Lightning Protection

Upgraded Truck Scale Maintains Peak Efficiency

Downtime during the peak season can eat up an agricultural operation's profits. To improve productivity, a cotton processor needed a solution for the maintenance problems that were plaguing its vehicle scale. Replacing old load cells with advanced technology gave new life to the company's aging scale.

Originally a family-owned, grain-buying operation, Commonwealth Gin built its first cotton gin in Windsor, Virginia, in 1992 and later added a second in nearby Franklin. Both plants weigh inbound seed cotton, separate fiber from seed, and then weigh outbound seed. Comparing weights of incoming cotton against outbound seed helps a grower know his or her yield. Accurate outbound weights also help ensure Commonwealth gets the most profit for its effort.

Costly downtime

After decades of use, Commonwealth's legacy vehicle-weighing systems at its Windsor facility were showing signs of age. Parts had become difficult to find. Portions of the system had even become obsolete, resulting in less-than-optimal service from the previous supplier.

Resulting downtime ate into the company's profits. Poor data integrity also created headaches for plant management.

Commonwealth Gin's Shipping Manager Christopher Alphin began the search for a new weighing service provider. He wanted a larger team of technicians with deeper experience troubleshooting large industrial operations like Commonwealth's.

Improved service

Alphin's search led him to Carlton Scale, the third-largest METTLER TOLEDO distributor in North America. Carlton Scale has one of the largest systems-integration groups anywhere, with services that include customizing automated weighing and data-collection systems. ISO-17025 accreditation means Carlton Scale technicians can expertly talk to Alphin and his managers about important quality-control topics.

Ultimately, Alphin and his Carlton representative decided to replace Commonwealth's legacy vehicle-scale systems after settling on a winning combination: a METTLER TOLEDO IND560 PDX terminal connected to POWERCELL® PDX® load cells. Alphin was impressed by both



With POWERCELL® PDX® technology, Commonwealth Gin is able to meet the demands of its busy season without having to worry about downtime.

the equipment's comprehensive warranty and the load cells' on-board digital diagnostics. The easy-to-monitor diagnostics constantly analyze scale health. In the unlikely event of failure, the system makes it possible for a technician to find and replace a component in just minutes – not days or weeks.

Zero downtime

Fortunately, the need for such a replacement hasn't arisen. "We have had zero downtime with the new equipment," Alphin says. That was especially important during Commonwealth's peak season, from October to December. Equipment failures at those times used to require truck diversions that cost the company, not just in time and labor, but also in fuel.

In fact, Commonwealth's gains with Carlton and its new METTLER TOLEDO equipment have been so impressive that plant management decided to completely rebuild two other plant weighing/automa-

tion systems that were starting to show signs of wear. Both required new hardware and custom software.

Easier expansions

Now, Commonwealth Gin is poised for even greater success. In addition to the excellent day-to-day service Alphin has received during installation, he knows he's got Carlton Scale and METTLER TOLEDO on his side for future expansions as well – expansions that will be made easier by the smart, modular designs of both IND560 PDX and POWERCELL® PDX® load cells. "We are very pleased," Alphin says.

► www.mt.com/UpgradeToPDX-ve

See the Difference



Obsolete weighing technology wastes money. Watch this short video to see how upgrading your vehicle scale can eliminate excessive maintenance costs:

- Downtime
- Frequent repairs
- Replacement costs
- Recalibration

► www.mt.com/ConvertToPDX-ve

A Real Labor Saver

Unattended Weighing Cuts Operating Costs

Self-service is revolutionizing the way we do business. It offers an effective strategy for reducing operating costs and increasing productivity. Adding unattended terminals is a simple way to introduce self-service efficiency to your vehicle-weighing operation.

A scale with an unattended terminal allows drivers to process their own weighing transactions. It eliminates the need to have a scale operator perform the simple tasks required to complete a transaction. Although unattended weighing systems can be used anywhere, they are especially valuable to facilities that operate multiple scales.

Unattended benefits

Unattended weighing offers a number of potential benefits:



IND9U unattended weighing terminals are available with data-entry options that will meet the needs of your business.

- It eliminates the need to keep a scale operator on duty
- It eliminates the need for a scale house
- It processes trucks quickly
- It allows 24/7 operation

Your ability to realize these benefits depends on the unattended system that you buy and how it is set up. If an unattended terminal is unreliable or hard to use, it can turn into a costly bottleneck.

Automated weighing

The first thing to consider is the software that will run your unattended weighing operation. It must provide a simple and intuitive process for drivers to follow. This requirement is especially important when drivers are not trained on how to use the unattended terminal.

DataBridge™ MS software provides a powerful unattended package that can be customized to meet the needs of your business. It doesn't just process transactions. It allows you to automate your weighing operation and integrate the data collected during transactions into your existing business systems.

Another consideration is the unattended terminal itself. You will need to determine what data you want drivers to enter during transactions and the most efficient way to enter the data. IND9U unattended terminals offer a range of input and output devices, such as touch screens, keyboards, and card readers. They make it easy to transfer data to your financial system and other business operations.

► www.mt.com/DataBridge-ve

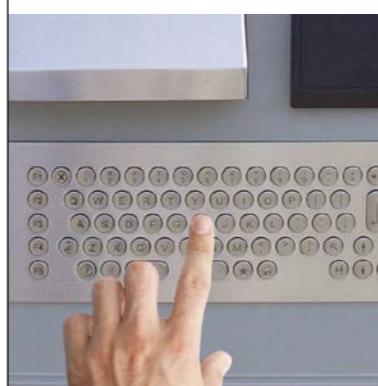


Touch Screen



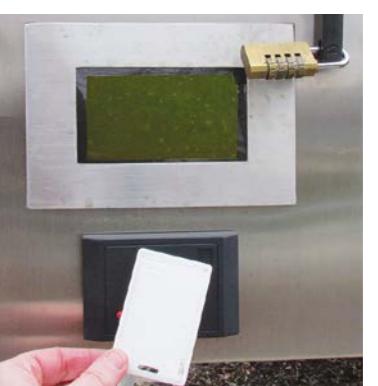
A touch screen is a simple and intuitive tool for entering data. It allows you to prompt drivers for information and display a predetermined list of responses. Drivers enter a response simply by touching a button on the screen. If additional information must be typed manually, drivers can use the touch screen's virtual keyboard.

Keyboard



A standard keyboard allows more freedom when entering data. Drivers can use a keyboard to type information instead of being limited to predetermined responses. A keyboard also allows drivers to scroll through data on a screen and select the desired option. Because a keyboard is a familiar tool, most people have experience using one.

Card Reader



A card reader allows drivers to enter data by scanning a proximity card, smart card, or other type of card. It provides a very simple procedure that combines speed and accuracy. Drivers do not need to worry about typing or selecting the wrong information. A card reader is ideal for simple transactions requiring entry of predetermined data.

Your Eye in the Sky

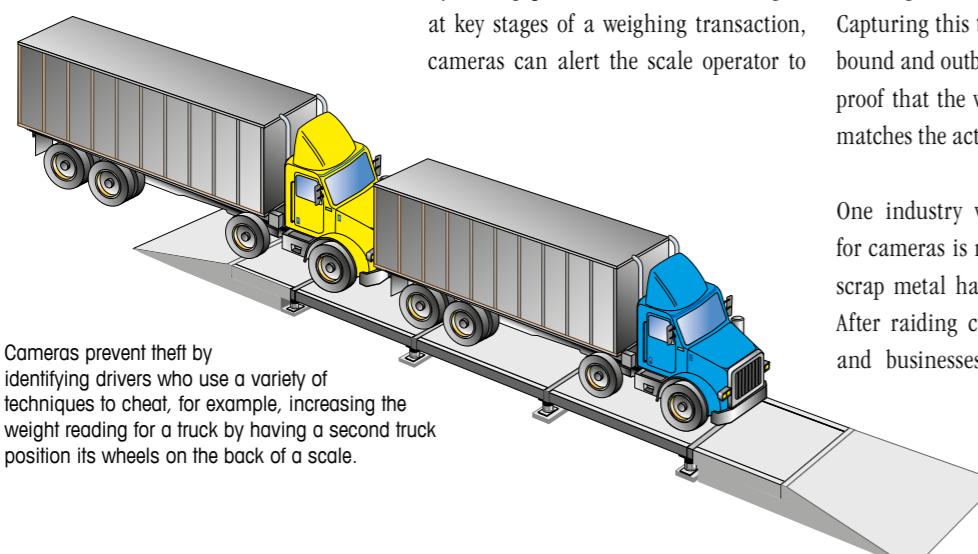
Use Cameras to Prevent Theft

It takes a sharp eye to protect your business against theft. When thieves know that they are being watched, they are less likely to try to steal or cheat. Equipping a vehicle weighing operation with cameras is an effective way to keep scale operators and users honest.

Video surveillance is a fact of modern life. When we shop at a store or walk down a city street, there is a good chance that a camera is watching us. The mere presence of a video camera is often enough to deter criminals.

Anti-theft tools

The same security cameras that protect local stores can be valuable anti-theft tools for truck scales. You might be surprised by how many ways they can be used. The key to their effectiveness is to connect them to a powerful software system that will record the right images at the right times.



Identification is a basic function of cameras at a truck scale. When cameras are positioned correctly, they can record images that identify vehicles, drivers, and license plates. If you discover that a crime has been committed, you can use these images to help catch the perpetrator.

Spotting cheaters

Cameras also provide proof that cheating has occurred. A common tactic of unscrupulous drivers is to position their trucks with the wheels partially off the scale. While a busy scale operator might miss the violation, properly positioned cameras will not.

By taking pictures from several angles at key stages of a weighing transaction, cameras can alert the scale operator to

cheating and store a visual record of each stage. When set up correctly, cameras can foil cheaters by verifying the following requirements:

- The vehicle is positioned correctly on the scale
- Only one vehicle is on the scale
- The driver is in the vehicle
- The same vehicle is used for inbound and outbound weighing
- The vehicle has been loaded or unloaded

Another benefit of cameras is that they help resolve disputes about the weights printed on tickets. You can position a camera to show both the vehicle and the weight reading on a remote display. Capturing this type of image for both inbound and outbound weighings gives you proof that the weight printed on a ticket matches the actual weight from the scale.

One industry with a growing demand for cameras is metals recycling. Stealing scrap metal has become a big business. After raiding construction sites, homes, and businesses, thieves cash in their



stolen metals at recycling centers. Some brazen thieves have been known to steal scrap metal from a recycling center and license plates to identify and prosecute violators.

Simpler record keeping

To combat the problem, many local governments are requiring scrap metal dealers to keep thorough records of all transactions. Cameras offer an effective solution that can simplify record keeping. Scrap metal dealers can set up cameras to record key information for a transaction: vehicle, driver, license plate, vehicle weight, material.

Because scrap metal dealers operate a cash business, they are tempting targets for robbers. Security cameras help deter thefts and protect workers.

weight regulations. The goal is to provide photographs of vehicles, drivers, and license plates to identify and prosecute violators.

Increased effectiveness

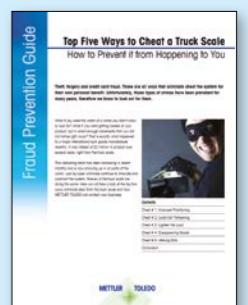
DataBridge™ MS software has a camera option that enables you to increase the effectiveness of your cameras. You can use it to operate a series of cameras at each scale and capture images of specific events during a transaction. The software can include images on the tickets for transactions.

Protect your business against theft. Find out more about DataBridge™ MS software's camera capabilities and other anti-cheating features.

► www.mt.com/DataBridge-ve

Legal-for-trade scales are not the only vehicle-weighing operations that can benefit from cameras. In many countries, cameras are used at scales that weigh trucks to ensure compliance with highway

Stop the Cheaters



Learn about the top five ways that criminals cheat at truck scales. A new white paper about fraud prevention reveals the five most common scams and shows you how to stop the cheaters cold.

Visit the METTLER TOLEDO web site and download the free fraud-prevention guide.

► www.mt.com/veh-fraud-prevention-ve

Knowledge Portal

Free Online Webinars

Learn the Value of Accuracy and Reliability

The Accuracy Difference

Find out why POWERCELL® technology is three times more accurate than analog:

- Smart technology
- Digital compensation
- Predictive diagnostics

► www.mt.com/veh-pdx-accuracy-matters-ve

The Reliability Difference

Find out how to solve the problems that account for 75% of maintenance costs:

- Prevent lightning damage
- Protect against moisture
- Eliminate downtime

► www.mt.com/veh-pdx-reliability-matters-ve



www.mt.com/ind-ve

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