Bulk Material Weighing

Industrial Weighing and Measuring

17 News

In-Motion Weighing

Up to Five Times the Throughput

When vehicles stop moving, they stop making money. In-motion weighing enables you to increase throughput by weighing vehicles without stopping them on a scale.

As more goods are transported over greater distances, highways and rail systems are being overwhelmed with traffic. The biggest bottlenecks are busy scale sites where vehicles face increasingly long delays waiting in line to be weighed and inspected.

Data collection

We offer in-motion weighing solutions for trucks and railroad cars. Each is designed to collect the vehicle weights and other data that your operation needs. Dynamic scales can be used to weigh shipping containers or determine net weights of bulk material.

Automated operation

Combine the speed of in-motion weighing with the efficiency of unattended operation. When used in unattended mode, our in-motion weighing systems identify vehicles and determine weights automatically without a scale operator. These systems collect data and share it with external software applications.

Today's vehicle-weighing operations cannot afford to stand still. This newsletter discusses our in-motion solutions for weighing vehicles and how they can increase throughput while reducing operating costs.

METTLER TOLEDO

A Single In-Motion Scale
Does the Work of Five Static Scales

More than 90 percent of ports and freight terminals weigh vehicles on full-length static scales. Our low-speed weigh-in-motion (WIM) technology can dramatically increase throughput for these and other applications that weigh large numbers of vehicles each day.

Compare in-motion weighing with static weighing

Whether determining gross vehicle weight or checking axle weights, static weighing wastes precious time by requiring every vehicle to stop on a scale. Our low-speed WIM solution combines accurate weighing with high throughput, weighing vehicles as they drive over a WIM platform at speeds up to 15 miles (24 kilometers) per hour. It can weigh five times as many vehicles as a static scale (based on average processing times).

▸ **www.mt.com/wim**

Watch the WIM video

Learn about WIM technology and how it improves productivity in highway and port applications.

www.mt.com/wim

	Static scale	Low-Speed WIM
		
Weighing time	5 minutes or more per vehicle	Less than 1 minute per vehicle
Platform length	70 to 80 feet (21 to 24 meters)	2.6 feet (0.8 meter)
Initial cost	Full-length scale with concrete foundation	One WIM scale replaces five static scales
Maintenance	Maintain large platform with 8–10 load cells	Maintain small platform with 4 load cells
Versatility	Static weighing only	WIM or static weighing
Processing	Manual vehicle processing	Automated vehicle processing
Entry gates	Traffic volumes at many large ports require 15 to 25 entry gates with a full-length static scale at each gate	Three WIM portals can handle about the same traffic volume as 15 entry gates with a static scale at each gate

> “WIM scales improved our throughput from 15 minutes plus down to 30 seconds.”
>
> Port operations manager

How a Major Port Uses WIM Scales in Its Automated Check-In System

WIM portal

As each vehicle passes through the in-portal, a WIM scale measures the gross weight, while tag readers identify the vehicle’s chassis and trailer. By subtracting stored weights for the chassis and trailer from the gross weight, the system automatically determines the verified gross mass (VGM) of the cargo container.

Entry gate

After being weighed and scanned, each vehicle proceeds to an entry gate. Based on the VGM and other data collected at the in-portal, vehicles are approved for entry or required to stop for additional inspection. Message boards at the gate direct each vehicle to the appropriate unloading or inspection area.

Time savings

METTLER TOLEDO WIM technology is vital to the port’s automated system for inspecting cargo containers. When the port relied on static weighing, it required an average of 15 minutes or more to process a vehicle. In-motion weighing reduced the average time for a vehicle to pass through the entry checkpoints to 30 seconds.

WIM scale
1. Trailer axle
2. Drive axle
3. Steering axle

Output from WIM scale:
1. Steering axle weight
2. Drive axle weight
3. Trailer axle weight
4. Gross vehicle weight

Eliminate Fines for Overloaded Vehicles

WIM technology is also a valuable tool at a port’s exit gate. It provides an efficient way to ensure that each vehicle leaving the facility with a container complies with highway weight limits. The WIM system automatically checks axle weights and gross vehicle weights, as well as compliance with the Federal Bridge Formula. In-motion weighing allows ports and freight terminals to handle large numbers of vehicles without backups and delays.

www.mt.com/wim

In-Motion Weighing
Improve Safety and Productivity

Traffic backups at a truck scale are nothing compared with those at a railroad scale. Whether a train is pulling 20 or 200 cars, they all line up at the scale to be weighed. Keep your bulk material moving with a coupled in-motion (CIM) scale that weighs railroad cars quickly and safely.

www.mt.com/ind-rail-cim

Benefits of Coupled In-Motion Weighing

Reduce weighing time
A CIM system weighs individual railroad cars accurately as a train travels across the scale at a speed of six miles (10 kilometers) per hour. It eliminates the need to stop the train repeatedly to uncouple and recouple cars. Even the longest train can be weighed in minutes.

Reduce labor
CIM weighing is so simple that the only labor required is driving the train across the scale. No workers are needed to uncouple and recouple railroad cars or position cars on the scale. A CIM system in unattended mode also eliminates the need for a scale operator.

Improve safety
Coupling railroad cars is a dangerous job. It places workers between heavy cars that are being moved by a locomotive operator who is not in their line of sight. By eliminating the need to couple/uncouple cars, a CIM system reduces the risk of serious injury to workers.

In-Motion Weighing by the Numbers

Time savings
To weigh railroad cars on a static scale, workers must uncouple each car, position it on the scale, and recouple the cars afterward. Weighing an entire train can take hours. How much faster is dynamic weighing? Determine the length of the train and factor in its speed as it travels over the scale. The time required to weigh a train that is 6,560 feet (2 kilometers) long and moving at a speed of 6 miles (10 kilometers) per hour is 12 minutes.

12 minutes
Length of train
÷
Speed of train

The cost of errors
Our CIM scales are approved for the highest accuracy class (±0.2 percent error). Many others struggle to meet the lowest in-service class (±2.0 percent error). The following example shows how much money you stand to lose with a scale that barely maintains tolerance.

$15,000 per train
50 cars
x 100 tons per car
× $150/ton
× ±2.0% error

Coupled In-Motion Solutions
for Every Application

1. Single-draft weighing

CIM Scale: Combined Platform

High accuracy for weighing stable loads

Single-draft weighing

Single-draft weighing captures a single weight reading for each car. It uses two scale platforms of different lengths to make a combined platform that is longer than the longest car being weighed. Single-draft weighing provides high accuracy, but the scale must switch to dual-draft weighing if variations in length and spacing prevent cars from fitting on the combined platform.

Advantage: High accuracy except in dual-draft mode.

Disadvantage: High initial cost due to longer platforms.

2. Dual-draft weighing

CIM Scale

Low initial cost for weighing stable loads

Dual-draft weighing

Dual-draft weighing captures a weight reading for each wheel carriage and sums the readings to calculate the total weight of a car. It uses one scale platform that is slightly longer than an individual wheel carriage. This method works well for cars that carry stable loads. It is considerably less accurate for cars that carry liquids.

Advantage: Lowest initial cost.

Disadvantage: Lower accuracy than single-draft weighing.

3. Pseudo-single-draft weighing

CIM Scale CIM Scale

High accuracy for weighing liquids

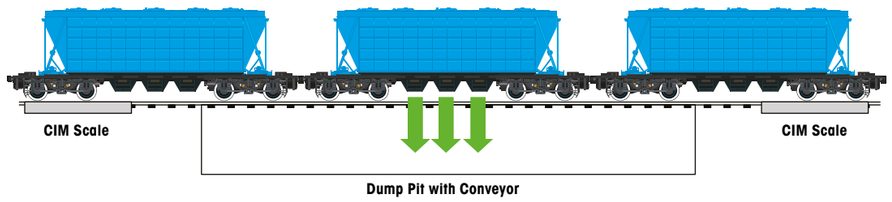
Pseudo-single-draft weighing

This patented system is designed for weighing liquids, which shift weight while a car is in motion. Two scale platforms (each slightly longer than an individual wheel carriage) are spaced to match the distance between the average car's wheel carriages. Each platform captures a weight reading when a wheel carriage is centered on it and sums the readings to calculate the total weight of a car.

Advantage: A cost-effective method of weighing liquids, combining low initial cost with accuracy nearly equal to single-draft weighing.

Disadvantage: Lower accuracy than single-draft weighing for solid materials.

Application: Integrate your CIM system



Integrate weighing and unloading

Integrated CIM systems

Improve productivity by integrating CIM scales into an operation that unloads grain or other bulk material. In a typical application, the railroad track runs through an enclosed transfer facility. As the loaded railroad cars enter the enclosure, they are weighed on an inbound scale. Then they pass over a dump pit, opening their hopper doors to unload the bulk material onto underground conveyors. The empty cars are weighed on an outbound scale as they exit the enclosure. This integrated solution enables you to unload and weigh an entire trainload of material in minutes.

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Integrated Weighing
Put Your Weight Data to Work

Data management is essential for in-motion weighing. In addition to operating your scale, a coupled in-motion (CIM) controller collects data for each railroad car and transmits it to other systems. It is the crucial link that improves the productivity of your plant operations.

▸ **www.mt.com/ind-rail-cim**

Data input

(from scales, wheel detectors, and tag readers)

- Weight
- Speed
- Direction
- Rail car identification
- Material identification

CIM Railroad Scale

1	**IND9R86 controller handles both static and dynamic weighing**
2	**Switch between manual control and fully automated unattended weighing**
3	**Overload detection and alarm prevents fines and equipment damage**
4	**Rollback detection and recovery for load-out applications**

IND9R86 CIM Controller

The IND9R86 CIM controller enables you to integrate railroad scales with your plant operations via material requirements planning (MRP) or manufacturing execution system (MES).

▸ **www.mt.com/ind-rail-cim**

1	**Computer-based system provides superior data storage**
2	**Programmable logic controller (PLC) interface to plant automation networks**
3	**Reports generated automatically as trains are weighed**
4	**Export data in real time or scheduled batches**

Data output

RS-232 • Modem • Ethernet • Fiber optic • Wireless •

Computer network

Five Ways to Cheat a Truck Scale
Is Your Business at Risk?

Theft, forgery and credit card fraud. Those are all ways that criminals cheat the system for their own personal benefit. Unfortunately, those types of crimes have been prevalent for many years, therefore we know to look out for them.

#1

Improper positioning

The most common way to cheat at the truck scale is also the simplest: improper positioning of the truck on the weighbridge. There are several scenarios that make this possible for a truck driver to accomplish.

#2

Load-cell tampering

Unfortunately, tampering with load cells is becoming a popular way of cheating the truck scale. This cheat could go undetected for months before a scale operator is aware of the problem, costing the company thousands of dollars.

#3

Lighten the load

This cheat at the scale is a good example of how thieves are becoming more innovative. It is most common at sites with two-pass transactions and when there is some distance between the scale and where loading or unloading occurs.

#4

Disappearing goods

This cheat at the scale is most common at companies that have a dedicated fleet of trucks that run the same route all day. It is most easily explained through an example.

#5

Altering data

The final cheat that has been most observed in the field is perhaps the most direct: the intentional altering of data collected at the scale. There are a couple scenarios in which that can happen, and they are of equal concern to a business owner and operator.

Download free fraud prevention guide

www.mt.com/veh-fraud-prevention

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