



# Truck Scales Buying Guide

## Site Planning



**When it comes time to develop a plan for the scale site, it's important to consider future needs:**

- Scale site layout
- Site conditions
- The foundation
- And more



# Scale Site Layout

Let's consider the number of trucks you will be weighing each day. In most cases, each truck will be weighed twice – once loaded and once unloaded.

**Small commercial operations** typically make 50 to 100 weighments per day. Unless all of the trucks arrive at the same time, the requirements for parking and maneuvering will be minimal. One scale should accommodate this volume well, so plan on two-way traffic over it. Make sure there is a bypass around the scale as well.



**Moderate-volume operations** typically make 100 to 200 weighments per day. Those sites should determine when those trucks will be arriving and departing because these sites may need a parking/staging area. The scale queue should not extend onto public streets or highways. Those sites may be able to operate with a single scale and bypass if the traffic flow at peak times is manageable. However, two scales can offer advantages.



**High-volume operations** typically make more than 200 weighments per day. Planners at these sites should be thinking in terms of traffic patterns (control lights and gates, marked roadways, etc.) not just a parking area. Those sites require two or more scales. If you expect to handle a significantly higher volume of traffic, you should consider more than two scales. For maximum flexibility, the scales should be able to handle loaded or empty trucks from either direction. There should also be a sufficient bypass around the scales.



## Layout drawing

Draw a complete plan of the area and think about an average day.

- Where do the trucks go when they arrive?
- Will there be a queue (either or both ways) to use the scale?
- Where do trucks go after being weighed?
- Is there enough maneuvering room between the scale and the loading docks, considering the turning radius of your largest vehicles?
- Do you need a trailer storage area?

Then consider the what-ifs.

- What if a scale is down for maintenance or repair during the day?
- What if you get a heavy snowfall, or a heavy rain fall?
- What if the capacity of the plant is increased?
- What if drivers are forced to wait before they can load or unload?
- What happens during the busy season?

### **Testing the Location**

It can be worthwhile to perform a test of your selected site before breaking ground. That can be done with the help of traffic cones or other markers to signify the intended location of the scale and accessories. If possible, drive a truck through the configuration to check for issues. Ask experienced drivers if you are unsure of the space they need to maneuver.

### **Housekeeping**

The buildup of spilled material, packed debris, frozen snow/ice, road mud, etc., under or around the scale can have a significant impact on its life and performance. That is why many suppliers and customers advocate for an open-sided design that can be regularly cleared of stray material. Locating a water hydrant near the scale can aid in regular cleaning operations, so long as pressurized water spray does not present a problem to the load cells, cables, and/or junction boxes at the scale.

Mining and aggregates facilities in particular have had success installing wheel/truck wash lanes before the scale. With an automatic wash lane for cleaning the trucks before they approach the scale, the amount of dirt, mud and gravel falling off the trucks is greatly reduced. It limits the chances for the debris to interfere with the operation of the scale. It also allows for a more accurate weight reading.

### **Filling Applications**

Some sites use their scale as a filling tool, where exact amounts of product need to be dispensed into the truck. Those locations may have overhead filling equipment that can limit the vertical space the scale can occupy. Share intentions to use your scale in filling operations with your scale supplier. They may be helpful in suggesting the best configuration and additional scale accessories that can assist these operations.

When estimating the amount of traffic, consider how your operation will use a scale. Is the traffic flow constant, or is it significantly greater at



certain times of day or during certain seasons? How long will a truck remain on the scale? Plan your installation to handle the peak periods.

## Site Conditions

There are a few site condition considerations that must be accounted for – subsurface obstructions, drainage and soil bearing pressure.

### Obstructions

Subsurface obstructions include man-made obstacles, such as water lines; gas lines; power lines; sewers and drains; and old landfills. They have to be moved or avoided. Natural obstacles that must be considered include high water tables, boulders, bedrock and sink holes. If you have any doubt about what's under your site, consider ordering test borings before you start excavation.

### Drainage

Every scale located outdoors needs adequate drainage. You do not want excessive storm water or snow-melt flowing over, through, or into your scale. Open-sided scales usually allow water to flow off of the foundation naturally. Pit scales, on the other hand, need sufficient drain piping and/or sump pumps.

If your area experiences freezing temperatures, also consider frost heave. Damage to the scale foundation can result from the subsurface around the scale expanding and contracting. Adequate subsurface drainage reduces that risk.

### Soil Bearing

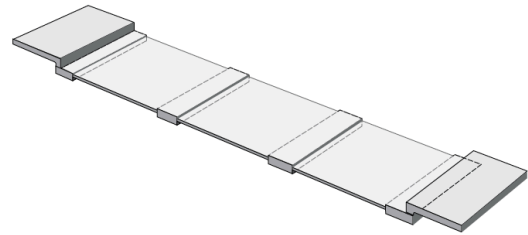
The soil at the site needs to be strong enough to support the foundation, the scale and the loads the scale will weigh. That is determined by establishing the soil bearing pressure at the site. Many facilities will have this information on file from construction records when the site was developed. If not, and depending on your area, a civil engineering agency can assess the soil. The soil's strength may have an impact on the design of the foundation to be used. Specific requirements will be noted on your scale company's foundation drawings. These typically range from 7,300 kg/m<sup>2</sup> to 12,200 kg/m<sup>2</sup> (1,500 psf. to 2,500 psf.). If the soil bearing capacity is too low, the foundation design may need to be modified to compensate.

# The Foundation

A stable foundation is critical. Any movement or settling may throw your scale out of adjustment and necessitate re-calibration, or worse. Continued movement would mean a continuing need for re-calibration. Over time, an unstable foundation could move enough to exceed the scale's corrective capacity, in which case you must start all over again and build a new one. The foundation must be designed and installed properly. Work closely with your scale supplier. They can advise you on acceptable foundation designs for your locale and they probably have the names of several contractors who have done good foundation work in the past – those who can get it in straight, plumb and level. There are several types of foundation designs.

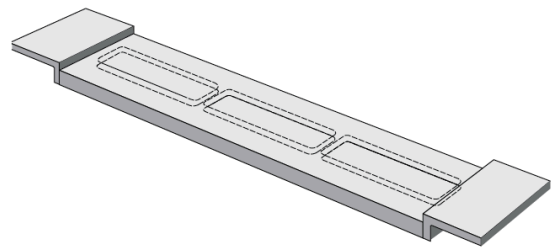
## Pier Foundation

The least expensive uses variable depth piers. Concrete piers are poured under each of the scale's load-bearing points. The total capacity of the scale determines the footprint of the piers, which are then dug to undisturbed soil below the frost line. The soil must have a minimum bearing capacity of 12,200 kg/m<sup>2</sup> (2,500 psf). It can be helpful to include a thin wash-out slab poured around the piers to aid in periodic cleaning.



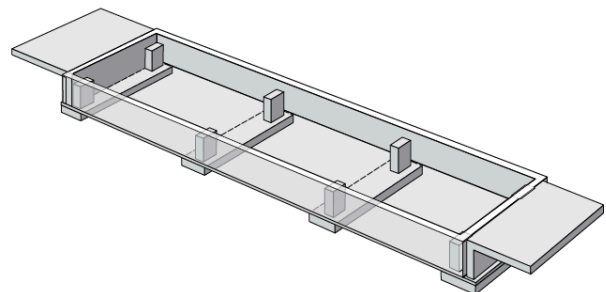
## Beam Slab

The beam slab has extra excavations beneath it that create beams of poured concrete for added support. It will typically include beams running the length of the scale along each side, as well as beams running the width of the slab. In combination, those beams make a ladder-bar formation below the visible slab. Minimum bearing capacity is approximately 7,300 kg/m<sup>2</sup> (1,500 psf). A beam slab foundation is stronger than a pier-style foundation.



## Pit Foundation

Pit foundations may be designed to allow service technicians adequate space to access components beneath the weighbridge. The recommended soil bearing capacities are similar to the beam-slab foundation.



## Locating the Scale House

The scale house is typically near the scale and may contain indicators, printers and other control devices. Data from the scale can be transferred on-line or in batches as needed to other locations. With the scale house adjacent to the scale, the scale operator can better:

- Monitor traffic
- Communicate with drivers
- Transfer paperwork to drivers
- Make sure the truck is on the scale properly
- Identify the truck and inspect cargo

Ideally, the scale house should be situated so that the operator inside can see the truck to ensure that it is completely and properly on the scale. The driver may not notice if the rearmost axle is not entirely on the scale. Or, some sites with pit scales have had issues with the placement of a truck's tires along the side of the scale. If the tires are not 100% on the scale, the weight reading will be inaccurate. To ensure proper placement of the truck on the scale, some have even used optical sensors along the edges of the scale. Video monitoring and voice intercoms can also work well if you are unable to put the scale house near the scale.



However, a scalehouse is not a necessity, as discussed in Section 2. Many scale companies now offer unattended terminals for driver self-service. Those terminals often take the form of a drive-up kiosk. That allows the driver to complete a transaction and log data without assistance from a scale operator. They can be advantageous in situations in which 24/7 access is required or when an organization processes repeated similar transactions.

## Approaches and Ramps

The approach is the part of the scale foundation that the truck drives over just before driving onto the weighbridge, or scale deck. In addition to the approach, the scale may need a ramp where the road transitions to the scale foundation. Guidelines for the approach are defined by the weights and measures authority in some areas.

For example, in the United States, a general recommendation is to make the length of the approach twice the width of the weighbridge. However, specific requirements

for approaches often are defined by local authorities depending on the types of trucks you are weighing and the materials they are carrying. There may be a maximum grade (slope) for the approaches and ramps – for example, 1/2 inch per foot in the United States. Be sure to check the standards for your location.



Approach requirements like those are minimums and do not guarantee that every truck can maneuver onto the scale without difficulty. You may need longer approaches if the trucks are coming off a turn and you are installing your scale above ground. Your scale supplier can give you advice on approaches.

A popular recommendation is to have an approach on each end of each scale (required in some areas). That minimizes the lateral forces generated by the trucks driving off. It also gives you the option of two-way traffic over the scale, which is an added measure of flexibility in your traffic pattern.

## Peripherals and Accessories

### Terminals

Your scale will have a control unit, often called a terminal or indicator. They can range from simple to elaborate. Below are some of the advanced features you may consider when choosing a terminal:

- Control more than one scale with a single terminal
- Connect with USB/Ethernet to computers and net works used to interact with scale software, transfer data across company networks and use remote diagnostics
- Connect wireless connectivity with the scale and other accessories
- Automate other scale accessories, such as gates and lights for traffic control
- View data on graphic displays with varying levels of detail
- Store tare/net weights with various memory capacities for transaction logging
- Connect to various compatible ticket printers



The terminal also may serve as the power supply to some or all of the load cells. Some will specify how many load cells they are able to support. If the supply power to the terminal is subject to fluctuation in your area, consider using an aftermarket power conditioner.

## Gates

Some sites place gates at one or both ends of the scale. Whether controlled manually or automated, they can indicate when a vehicle should drive on or off of the scale. This can also be accomplished with traffic lights.

## Lights

Often a green and red traffic light is placed alongside the scale to control the flow of traffic. They can be controlled manually or automated.



## Remote Displays



A remote display is a numerical display unit that indicates the weight on the scale. They are often placed at the front of the scale so the drivers and/or filling operators can see the weight of their truck when it is on the scale.

## Guiderails

Also called guardrails or rubrails, guiderails are an option for most truck scales, although some industries and safety regulations require them. They can be used with pit-style scales to provide guidance to the truck driver approaching the scale. They are more frequently used with above-ground (pitless) scales as a safety device to prevent trucks from driving off the edge of the scale. There are two styles of guiderails.



- **Scale-mounted guardrails** are attached to the weighbridge, by either bolting them to a bracket or welding them to the side of the weighbridge modules. They often can be supplied and installed by the scale supplier.
- **Stand-alone guardrails** are built alongside the scale, but are not attached to the weighbridge. In most cases, guardrails will offer superior protection from driving off the side of the scale. They are not always available directly from the scale supplier.



Instead, they may need to be sourced and installed by the contractor preparing the foundation.

## Hazardous Area and Materials

If you will operate the scale in hazardous areas (flammable or explosive atmospheric concentrations of gases, vapors, mists, dust, fibers or filings), you will

need a scale that has approval (generally from Factory Mutual, Underwriters Laboratories or ATEX) for use in your environment based on its classification.

Hazardous area approvals typically are noted on the specifications data for load cells and terminals.



For example, some hazardous area classifications place a limit on the amount of voltage that can be used in equipment. Some regulations require the use of energy-limiting barrier boxes to isolate signals. A good scale supplier should be familiar with these requirements and the types of peripherals that may be used in various areas.

However, the determination of the hazardous area classification is not the responsibility of the scale supplier. The qualified safety officer at the customer site or qualified local industry regulators must make that determination.