

**FAC 8923 VEHICLE SCALES**

FY22 SUC:                   \$6,354.50 / EA

Source:                     Inflated from previous FY using ENR labor and material cost indices to measure actual inflation

Original Source:         Multiple Industry Studies

Study	Annual Maintenance Cost	Publication Date	Escalation to FY19	Current
Fairbanks Morse	\$2,000.00	2011	1.240	\$2,479.34
Rice Lake	\$7,000.00	2009	1.241	\$8,688.79
			Average	\$5,584.07



## What every truck scale owner should know about scale maintenance

Do not be fooled by service companies selling scale maintenance agreements that lack focus on calibration. Calibration is the most important component of any periodic maintenance program.

Companies purchase scales because product entering or exiting company facilities are determined to have value based on weight. Without assured scale accuracy, through regular calibration, a company can lose thousands, if not hundreds of thousands of dollars annually, due to inaccurate weights.

Depending on the requirements and type of weighing device, annual maintenance costs for a truck scale run anywhere from \$1,000 to \$3,000. When measuring the pros and cons of maintenance costs, most users find that protecting against a weighing error can more than pay for a maintenance program and, often times, the cost of the scale itself.

### What's the potential damage?

Two hundred pounds may appear miniscule in the aggregate business, where a typical truckload of sand or gravel can exceed 80,000 pounds. However, when one does the math, this seemingly minimal error can substantially cut into profits over time. See the example below for the Acme Aggregate Company.

#### Acme Aggregate Company

Weighing volume	500 trucks per day
Weighing frequency	Five days per week
Product value	\$26.50 per ton
Scale inaccuracy	- <u>200 pounds</u>
<b>Lost annual revenue</b>	<b>\$345,500</b>

### Initial certification

Once a scale is installed, it is tested by the governing state's weights and measures organization. This test ensures the scale's commercial accuracy and protects the scale buyer, scale seller, and scale installation company.

Upon state approval, the scale is certified and open for weighing. However, the initial calibration does not come with a guarantee for continued accuracy.



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### Why is periodic calibration necessary?

Calibration is never guaranteed because accuracy is highly dependent on the way a scale is cared for and used. Weather, use and electrical current are just a few of the factors that can change the accuracy of a weighing device.

Therefore, all scales need to be tested periodically. Test frequency depends on various factors:

- Number of weighments per day
- Price of the product being weighed
- Number of days the scale is used annually
- Acceptable error rate



Test cart

### Five components of a good scale maintenance program

- State licensed service provider
- State certified test weights
- Thorough testing process
- Free inspection services
- Reporting

### State licensed service providers

It is important for owners to understand that a commercial scale company cannot certify a scale. The only entities that can issue certification are state weights and measures organizations. However, a commercial scale company does have the authority to recalibrate and reinstate an inaccurate scale that has been "tagged-out\*" by the state, as long as the company is state licensed and registered in good standing. Owners should always request to see the valid license.

*\*Tagged-out – When a scale fails a state weights and measures test for accuracy, the state attaches a lockout tag to the scale, rendering it unusable for commercial trade.*



Test weights

### State certified test weights

Calibration is completed using state certified test weights. An established scale service company typically has its entire inventory of test weights tested and certified annually, in accordance with state weights and measures standards. Other service companies, however, may have only a portion of their overall weight inventory tested each year. The reason for this lack of certification is typically cost. Weight testing requires an enormous amount of time and money to prepare the weights and deliver them to a metrology laboratory for testing. Often,



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weights are condemned and un-certifiable. This is why it is important to verify with your service provider that the weights have been certified.

All test weights have a stamp provided by the governing state weights and measures entity. It is also common practice, among companies that value quality, to request a copy of the test weight certification from the scale service provider. Weight serial numbers will be present on the certifications, and the customer can verify these numbers against the serial numbers on the test weights used by the service company.

### Thorough testing process

To test a weighing device properly, one must first determine the length of the platform and the total number of sections along that length.

A scale section is determined by the presence of a load point, which is simply the location of a load sensor (also known as a load cell or strain gauge). Load points are where weight is transferred from the load to the scale and where scale accuracy is maintained.

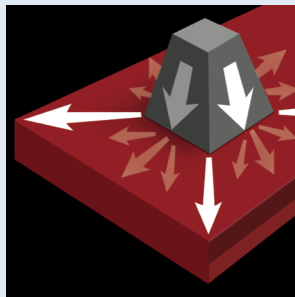
It is of critical importance, and mandated by the testing procedure of National Institute of Standards and Technology's (NIST) Handbook 44, that the accuracy of load points are maintained, so as weight is applied, it is transferred evenly. If a load point or section fails a strain test, then it must be calibrated to conform to requirements by making a mechanical or electronic adjustment.

The load point is not calibrated to a certified weight, but rather calibrated to assure all sections weigh exactly the same or within government specifications outlined in Handbook 44 and/or issued by a state sanctioned weights and measures organization.

### Value added service

Vehicle owners cannot avoid vehicle maintenance. The same is true for scale owners.

While calibration is the critical component of a scale maintenance program, a good service company will also conduct a free visual inspection and have the ability to provide any minor repairs while on site for the maintenance visit.



It is critical that the accuracy of load points is maintained, so as weight is applied it is transferred evenly.



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Visual inspection

A visual inspection should include:

- Condition of scale
- Any damages
- Clearance
- Mud/debris build-up
- Corrosion
- Regulatory conformance issues
- Safety
- Grounding
- Use issues
- Electrical conditions

A reputable service company will look at these items, as well as others, and offer solutions to any issues that are discovered

Most scale owners understand that it is better to repair and address issues when they are small, rather than wait until they are big and expensive.

### Reporting

A good scale maintenance program will provide thorough reporting for its client. Each maintenance inspection should include a written report that documents test results, both before and after calibration, as well as a summary of finding and recommendations, based on a free visual inspection.



### About Fairbanks

In 1830, Fairbanks Scales was founded in St. Johnsbury, Vermont, by Thaddeus Fairbanks, inventor of the world's first platform scale. Fairbanks manufactures technology-based scale products, provides nationwide service solutions and is a proud "Made in the U.S.A." company with more than 300 field service personnel.

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# TOTAL COST OF OWNERSHIP

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**Spend time now comparing Total Cost of Ownership (TCO) of a Rice Lake SURVIVOR® truck scale and save time and overhead costs in your future.**

Total Cost of Ownership is a method developed by the Gartner Group<sup>1</sup> in the late 1980s to identify, estimate and appraise costs related to capital equipment investment. Gartner first applied this methodology, to the process of purchasing, owning and using personal computers. Business professionals were surprised to learn that a PC initially costing less than \$1,000 averages a TCO over \$5,000 per year.

Today, TCO is accepted as a standard approach to evaluating the true cost of equipment ownership from purchase to retirement; a “cradle-to-grave” financial analysis. When TCO is applied to truck scales, the numbers are magnified by many powers.

Properly maintaining a poorly designed truck scale can cost \$7,000 or more per year. Scheduling regular predictive maintenance when it is convenient and least costly, rather than requiring reactive maintenance, makes that \$7,000 a bargain compared to revenue loss caused by inaccurate weighments. A food processor weighing 900 million tons of product annually across a vehicle scale with a discrepancy of -1%, could put their enterprise in financial jeopardy. One hour of downtime can cost \$10,000 in lost revenue to a busy asphalt company, where the truck scale functions as a cash register.

A few short years ago, a truck scale could be expected to last a generation or longer. Scale weighbridges were simply designed however utilized massive main girders, complex cast iron levers, heavy concrete decks, and finely machined tool steel components. Weighbridges were built like highway bridges with heavy iron I-beam construction to withstand years and years of heavy, constant traffic.

These scales however had to be installed in expensive deep wet pits, accuracy was difficult to maintain, and these products required intensive maintenance to insure consistent performance.

It was not until the early 1970s that manufacturers took a new approach to truck scale bridge designs that would eventually revolutionize the truck scale industry. The first totally electronic truck scales consisted of massive side rail I-Beams and compression type load cells, but they could be installed on simpler and less expensive concrete foundations on top of the ground—a tremendous breakthrough in technology.

CAD/CAM software permitted them to optimize the use of steel components and still meet the maximum load requirements by using structural support shapes of sheet metal instead of heavy I-beams. What most manufacturers failed to realize was that traffic was increasing and trucks were getting bigger and heavier, adding additional axles to carry more cargo with fewer trips.

As the sales of truck scale products became more cost competitive, and the cost of steel increased, manufacturers developed lower cost weighbridge designs resulting in lower-priced truck scales. New terminology was introduced like “Concentrated Load Capacity”, the “r” factor, and “Span Deflection Ratios” to establish the integrity of the high-strength to lower-weight ratio CAD/CAM designs. Manufacturers offered “Super Warranties” to cover minimal parts and labor. Based on these claims, many less informed buyers invested in lower priced, lighter-weight truck scales.

Hard lessons were learned in a short time. While some of these new ratings had value, they did not address the longevity of the equipment, which buyers were taking for granted. Steel welds popped, weighbridges twisted, scales literally broke in half, steel plates peeled or warped, and concrete decks cracked. The cost of weighment inaccuracies, repairs, and downtime not covered by “super warranties” far exceeded the perceived cost savings on purchasing a low cost truck scale with less steel content.



***In seven to eight years “bargain” scales had to be replaced.*** Then the essential question became “How much will it cost?” Again, the common mistake buyers made was in considering only the purchase price of the replacement scale and ignoring the associated costs such as torching the weighbridge and modules down to manageable pieces, extra labor, crane charges, disposal fees, scale house construction and permits, site preparation, wiring and initial calibration to meet NTEP Handbook-44 requirements.

Conclusion: The single most important consideration in selection of a properly designed truck scale, is the structural integrity of the weighbridge.

## **HOW TO USE TCO TO COMPARE TRUCK SCALES:**

### **A. Direct Costs**

Add the following and divide by the expected truck scale life\*.

- Initial purchase price or lease payment
- Site preparation
- Installation

### **B. Indirect Costs**

Add the following and multiply total indirect costs by expected truck scale life\*.

#### Maintenance

- Preventive maintenance contracts
- Periodic calibration checks
- Spare parts, supplies and materials

#### Operations

- Labor (scale house operator, weigh ticket or bill of lading processor and related costs and fringe benefits)
- Scale house operation (value/share of site space, furnishings and equipment, network fees for modems, routers, T-1, wireless or ISD lines)

#### Estimated Downtime

- Interruption of use by scale and/or component mechanical or electrical problems
- Routine scheduled maintenance and calibration checks

#### Administrative Overhead

- Training, human resources
- Administrative
- Financial costs

\*Expected truck scale life of a SURVIVOR truck scale - 30 years. Expected truck scale life of a lighter weight truck scale - 10 years.

C. Total Cost of Ownership = A + B

<sup>1</sup>Gartner, Inc. is an information and technology research and advisory firm headquartered in Stamford, Connecticut. It was known as The Gartner Group until 2001. Gartner clients include many large corporations and government agencies, as well as technology companies and the investment community. Founded in 1979, Gartner has 3,700 associates, including 1,200 research analysts and consultants in 75 countries worldwide.