

# **WEIGH-TRONIX**



**Weightline Railroad  
Track Scale for Grain**

# Weighline Railroad Track Scale

## Introduction

*This paper reviews what Weighline is and how it differs from conventional track scales. It's application to the grain industry in both loading and unloading applications is described. At grain elevators it provides a cost effective method of monitoring the loading of rail cars to avoid overload penalties while fully using the capacity of the car. Unloading terminals can use an in-motion version of Weighline to check that cars have been fully unloaded.*

*In particular a car loading application at a grain elevator is described in some detail.*



## Weighline - What is it?

Weighline is a new type of railroad track scale that can be installed in a few hours and has much lower installed cost than conventional track scales.

Weighline consists of a length of rail that has been specially prepared and instrumented with a series of strain gauges to become a section of rail with a "built in" weighbridge. Weighline is effectively a wheel weighing transducer integrated into the rail. For most static applications, multiple Weighline sections are used so that there is a short "weighbridge" under each wheel of the vehicle being weighed.

## Weighline for overload detection and prevention

In the US the main application to date for Weighline has been for monitoring the weight of cars being loaded. When mounted on ballast, Weighline has an accuracy of about +/- 0.25%. Although they currently cannot be certified, they do provide for quite accurate car loading. The low installed cost plus the very low down time have made them particularly attractive for this application.

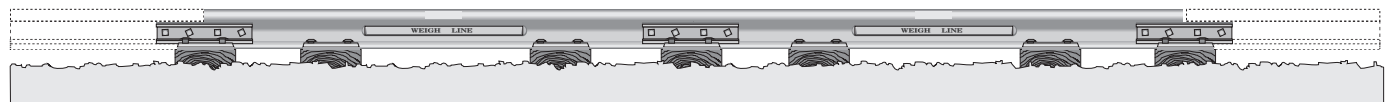
One big advantage of Weighline (and other track scales) for overload monitoring is that it measures the actual *weight on rail*. This eliminates the

uncertainties associated with tare weights, carry back and control gate malfunctions that can cause problems with net weight and volumetric load control methods.

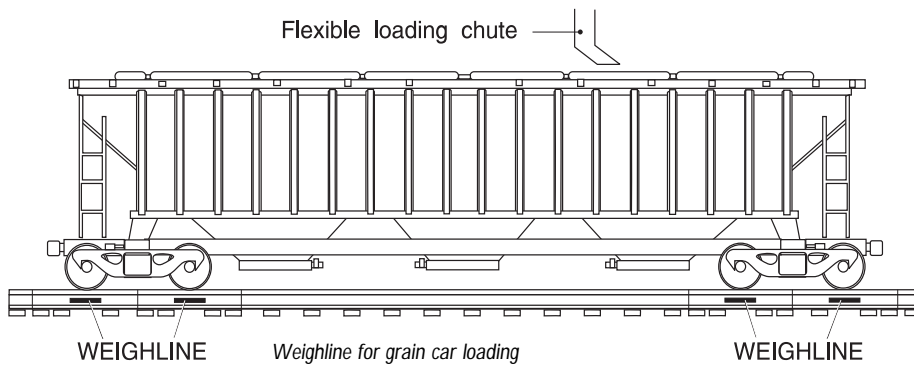
## Weighline Installation

Weighline rails are installed in line with existing rails and are usually mounted on ballast using regular ties and tie plates, eliminating the need for concrete foundations. Unlike conventional track scales, there is no clear demarcation line where the scale begins and ends because the rail itself is the scale.

Because a Weighline scale is effectively several short weighbridges, it is necessary to spot the car accurately, for static applications, within a few inches. Therefore, all cars to be full draft weighed should have the same or very similar truck centers. Odd sized cars may be weighed two draft by using the two draft mode of the weight indicator.



Typical Weighline Arrangement



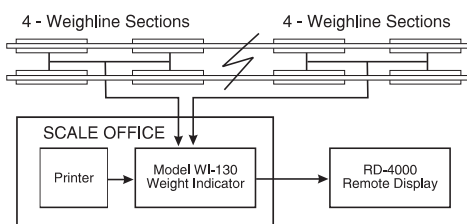
## Grain elevator hopper car loading application

Monitoring loading at grain elevators is one application where operators are reluctant to invest in a conventional track scale but do have an incentive to make sure their cars are not under or overloaded. An overloaded car can easily result in a cost of \$500 or more and an underloaded car can mean paying freight for product that is not being shipped.

Normally eight Weighline sections (5'10" long) are used, one under each wheel. The sections are positioned so that when the car is in the final loading position, each wheel of the car is on a Weighline section.

The instrumentation uses a special version of a standard weight indicator. A scoreboard type display is usually mounted so that the loading operator can monitor the weight of the car as it is being filled. Cars are typically loaded to within 500 lb of the maximum allowed capacity.

In some cases payback can be realized in 6 months or less.



Full Draft Weighline diagram

## Typical Weighline grain elevator installation

Assuming that the existing track is in good condition and the existing rail is the same size as the Weighline rails (normally 115 RE), you will follow these steps to install a full draft Weighline system.

- ❶ Determine where the Weighline sections are to go, then cut and remove four 11' 8" long sections of the existing rail.
- ❷ Place the Weighline rails in the four 11' 8" gaps in the rail.



Installing Weighline rails

- ❸ Mount standard 4-hole joint bars to the Weighline rails.
- ❹ Drill joint bar mounting holes in the existing rails for the joint bars. Bolt the joint bars to the existing rails.

- ❺ Adjust the tie spacing according to the Weighline drawing.



Adjusting tie spacing

- ❻ Check for correct gage and alignment of the Weighline rails, intermediate track and track for 25' either side; then fix Weighline rails to the repositioned ties.
- ❼ Install conduit, cabling and instrument.
- ❽ Calibrate system using a car of known weight.

Rail installation can be completed within a day and total installation within two days.

If existing rail is not 115 lb, then compromise bars are used to go from the existing rail to the 115 lb Weighline rails.

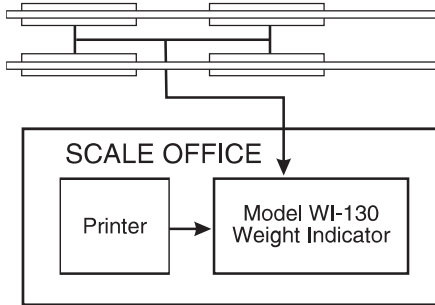


View of a Weighline installed

## Grain elevator two draft check scale application

Weighline is also being used by grain elevators as a very low cost, two draft, check scale. In this application four Weighline sections are used to weigh one end of the car and then the other. The scale indicator adds the two weights together to give the total weight of the car.

4 - Weighline Sections



Two Draft Weighing

The main disadvantage with this arrangement is that you do not have the ability to monitor and control the loading of the car as it is being loaded. However, it is the lowest cost method of rail car weighing, and for very low volume applications it can be adequate.

## Specifications (Standard static configuration)

- Rail type:** 115 lb AREA  
(consult factory for other sizes)
- Rail length:** 70" (1.78 m)
- Active weighing length per section:**  
: 8 inches (20 cm)
- Mounting:**  
Standard tie plates direct to ties
- Type of weighing:**  
Two draft or full draft
- Number of Weighline sections:**  
Two draft - four, Full draft - eight
- Maximum axle load:**  
80,000 lb (40,000 kg)
- Maximum car weight:**  
300,000 lb (150,000 kg)
- Scale division size:**  
100 lb (50 kg)  
switchable to 20 lb (10 kg) for calibration
- Static accuracy\*:**  
Full draft:  $\pm 0.25\%$  or  $\pm 200$  lb (100 kg),  
whichever is greater  
Two draft:  $\pm 0.4\%$  or  $\pm 300$  lb (150 kg),  
whichever is greater

**Instrumentation:** Weigh-Tronix WI-130 Indicator with Weighline program

**Operating temperature range:**  
-20°F to 120°F (-28°C to 49°C)

**Weight:** 230 lb (105 kg) per rail assembly

*NOTE: Weighline is not currently approved for certified weighing and cannot be used for custody transfer .*

## Other Weighline Systems Available

**Non standard rail sizes:**

20 lb/yd - 175 lb/yd

**Weighline section capacities:**

5,000 lb to 125,000 lb

**Scale capacities :**

20,000 lb to 1,000,000 lb

**Multiple Weighline sections:**

For different sized and special cars

Consult factory for specifications



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