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Siemens Industry, Inc / IA / Process Instruments

Belt Scales 101

About the Presenter

John Dronette is currently a Product Marketing Manager for Siemens Industry, Process Instrumentation Business Unit in Arlington, Texas. In his current role he is responsible for sales support and marketing of the Weighing Technology and Process Protection products.

John has been with Siemens and Milltronics for 27 years. During this time he has been a Field Service Engineer, Applications Engineer, Field Service Manager, and Customer Service Manager.

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Principal of Operation

Belt Scale Basics

Belt Scales Basics
Principal of Operation

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There are four essential components to any conveyor belt scale.

- Weigh Bridge

Belt Scales Basics
Principal of Operation

There are four essential components to any conveyor belt scale.

- Weigh Bridge
- Speed Sensor

Belt Scales Basics
Principal of Operation

There are four essential components to any conveyor belt scale.

- Weigh Bridge
- Speed Sensor
- Integrator

Belt Scales Basics
Principal of Operation

There are four essential components to any conveyor belt scale.

- Weigh Bridge
- Speed Sensor
- Integrator
- Conveyor

Belt Scales Basics
Principal of Operation

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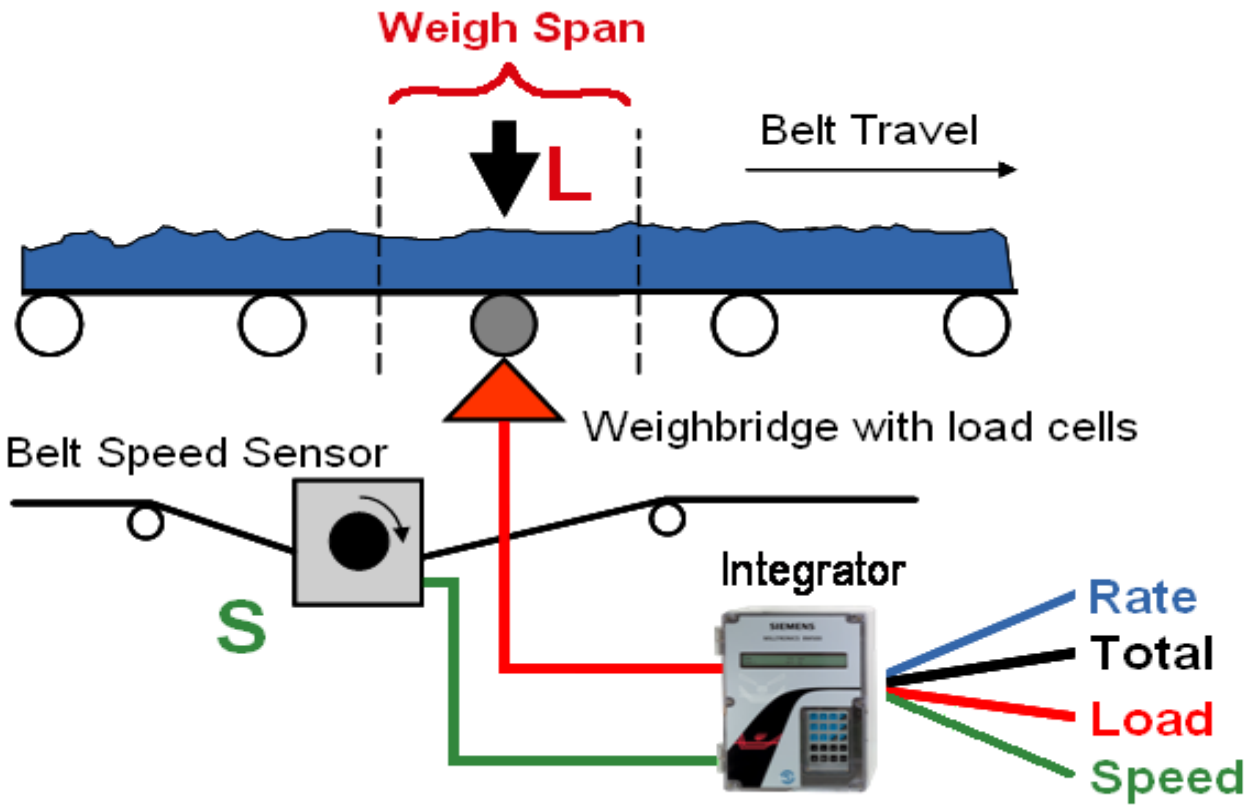
$$L \times S = R$$

$$\frac{lbs}{\cancel{ft}} \times \frac{\cancel{ft}}{min} = \frac{lbs}{min}$$



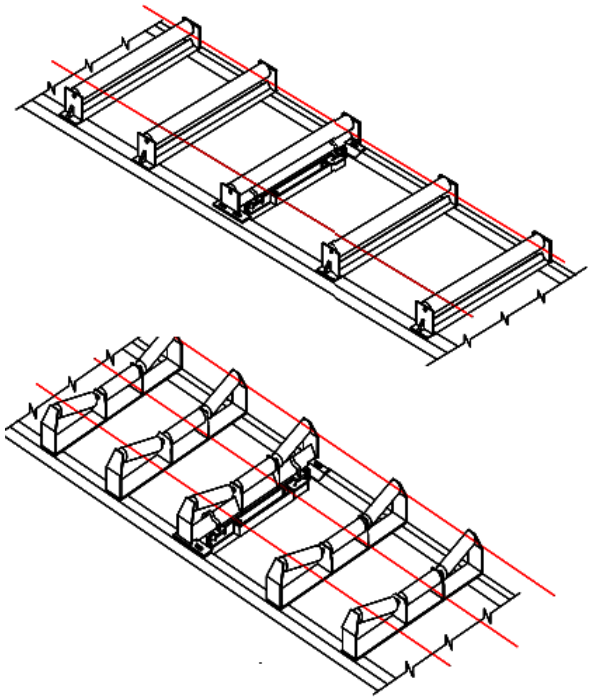
Conveyor Considerations

Belt Scale Basics

Belt Scales Basics
Conveyor Considerations

Use strings to align the scale with the idlers on each side of the weigh bridge.

- Each idler should be parallel to the idler next to it.
- The center of each idler should be inline with the idler next to it.
- Each idler should not be higher or lower than the idler next to it.

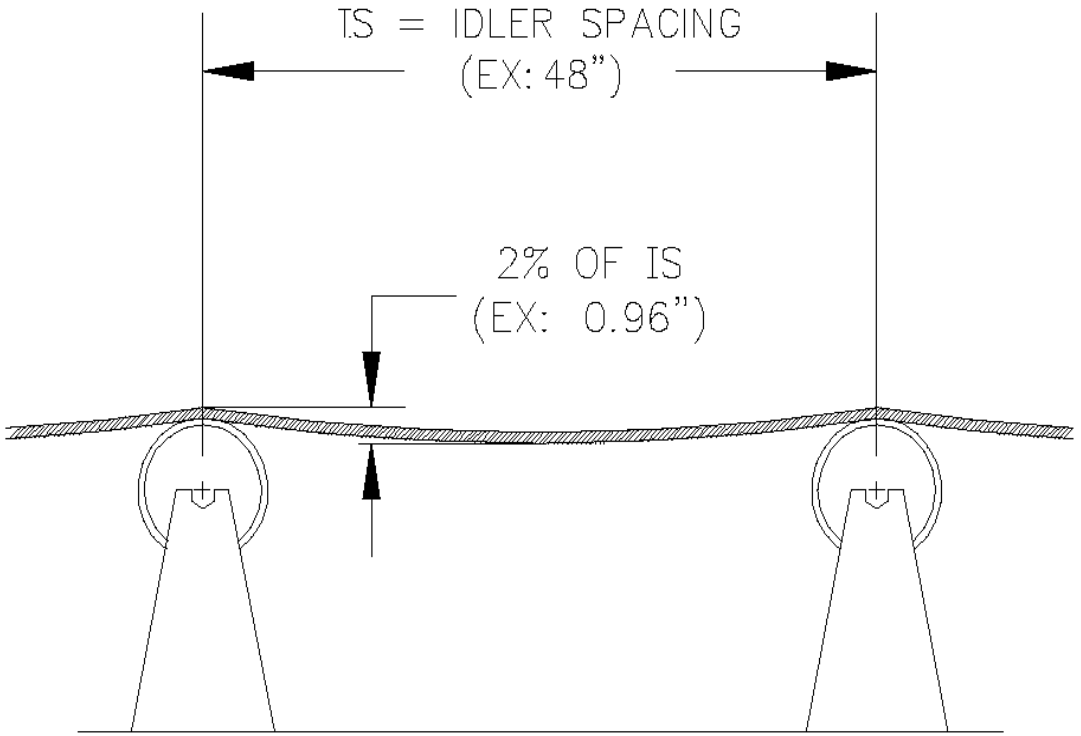


Minimum of 2, preferred 3, idlers on each side of the weigh bridge

Belt Scales Basics
Conveyor Considerations

Belt Tension

- A properly tensioned belt should have a noticeable sag between idlers of approximately 2% of spacing when loaded at conveyor capacity.
- Check action of belt tensioning device



Belt Scales Basics
Conveyor Considerations

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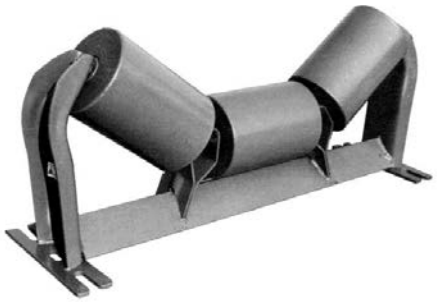
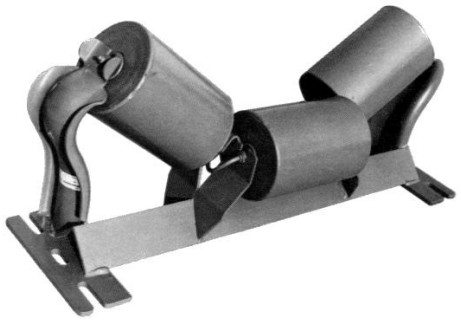
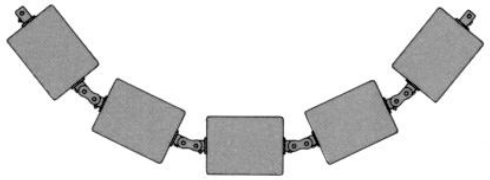
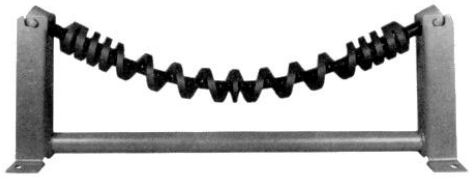
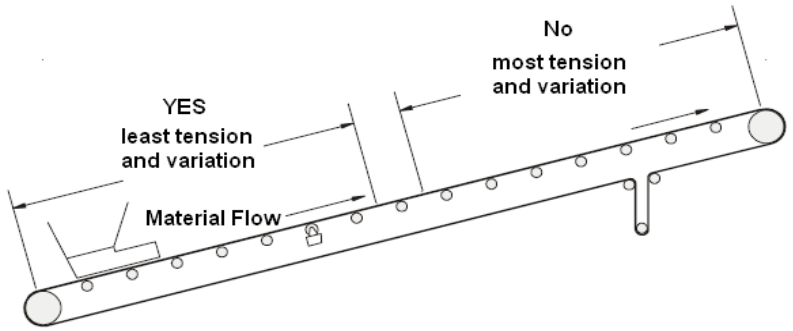
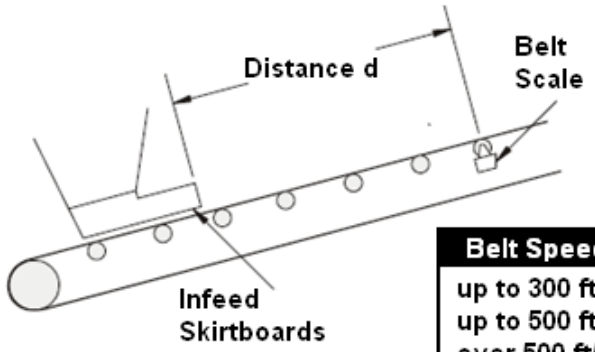
Standard Trough Idlers 	Offset Idlers 	Flat Idlers 	✓
Adjustable Trough Idlers 	Wire Rope Idlers 	Catenary Idlers 	X

Belt Scales Basics
Conveyor Considerations

Belt Tension

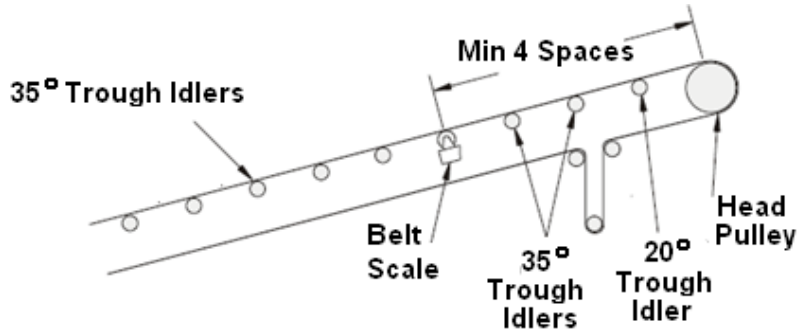


Scale Location In Feed Area

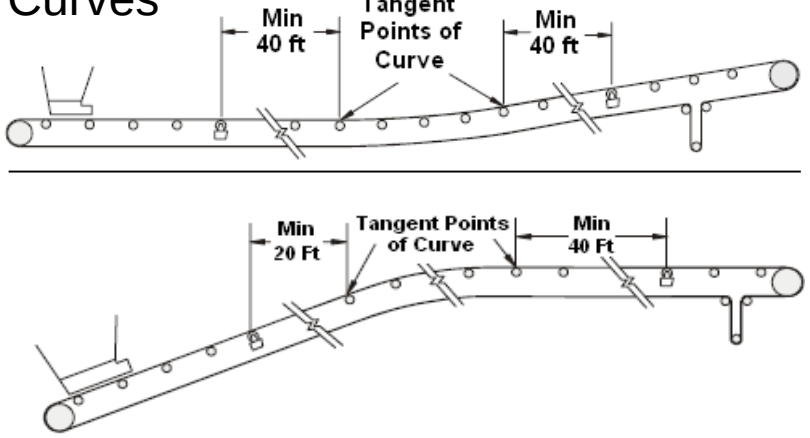


Belt Speed	d
up to 300 ft/m	6 ft
up to 500 ft/m	10 ft
over 500 ft/m	15 ft

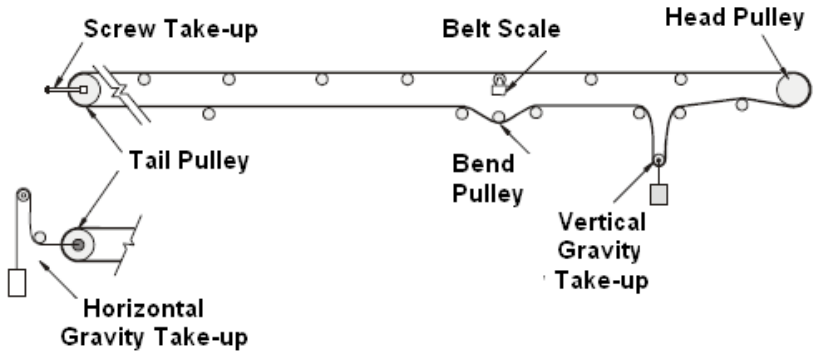
Scale Locations Head Pulley Area



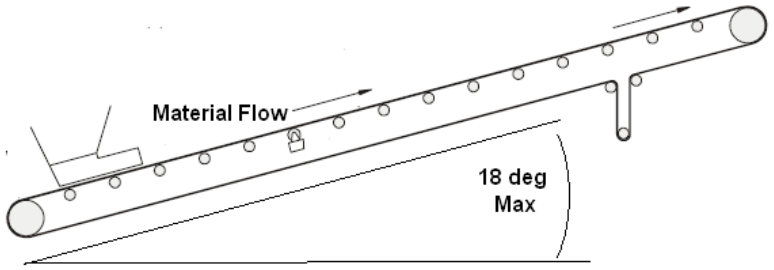
Curves



Tensioning Device



Conveyor Incline



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Calibration Methods

Belt Scale Basics

Belt Scales Basics
Calibration Methods

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Calibration Methods

A conveyor belt scale system will only be as accurate as the standard to which it is calibrated.
Scale can be calibrated in several different ways.

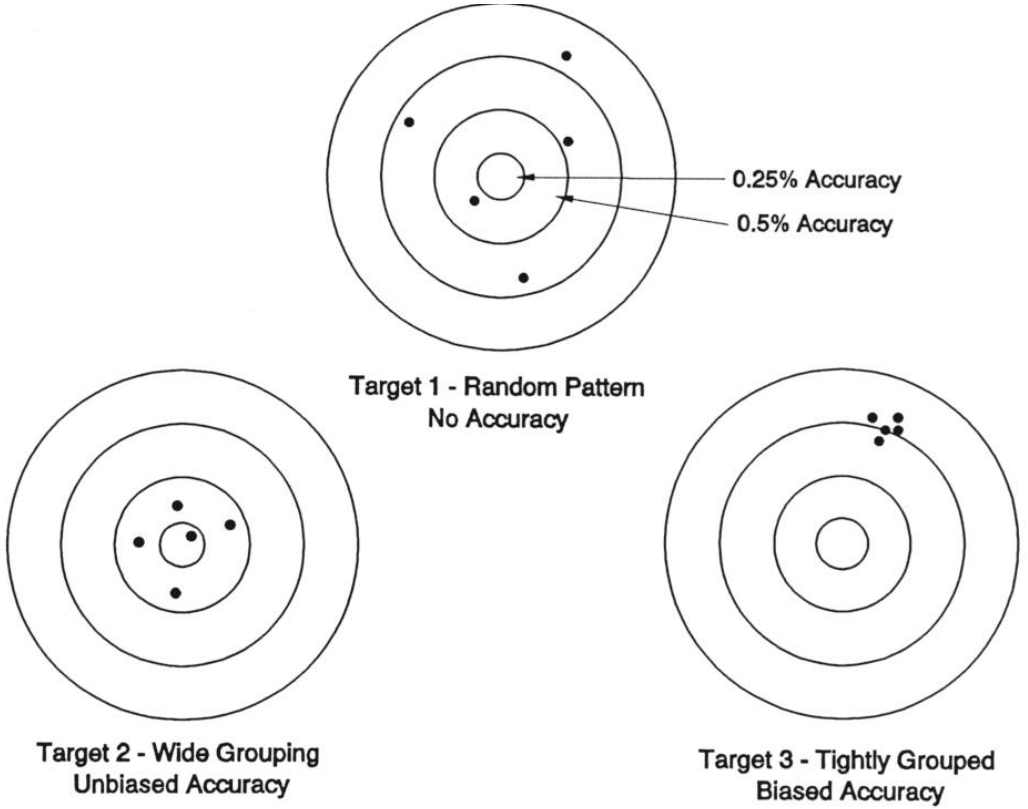
Simulated Load Tests

- Static Weights
- Roller Chain
- Electronic

Material Calibration

- Pre-weighed
- Post-weighed

Belt Scales Basics
Calibration Methods

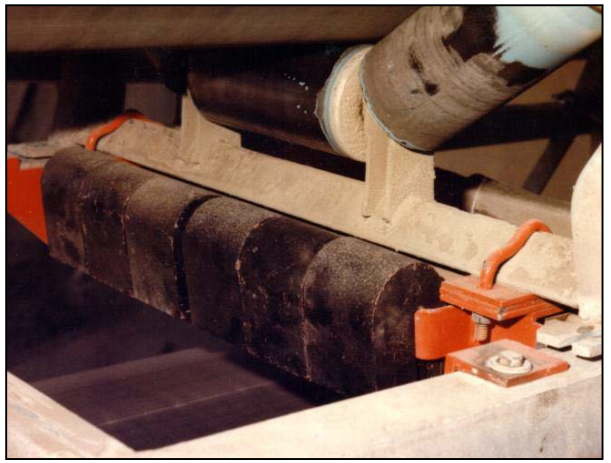


To understand what accuracy and repeatability are, visualize three targets. Firing five rounds at each target results in a pattern similar to the results of five calibration tests each with three belt scales.

Belt Scales Basics
Calibration Methods

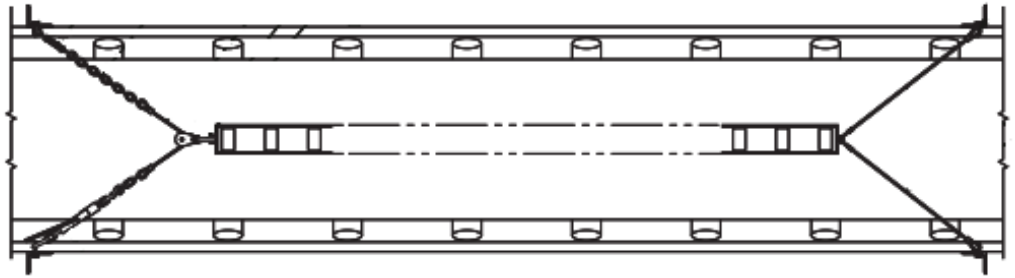
Static Test Weight Calibration

Static weights are placed on the weighbridge below carrying side of the belt during the span calibration



Calibration Chains

Calibration chains are large roller chains that are tied in place on the carrying side of the belt.



Belt Scales Basics
Calibration Methods

Compares totalized weight to reference scale

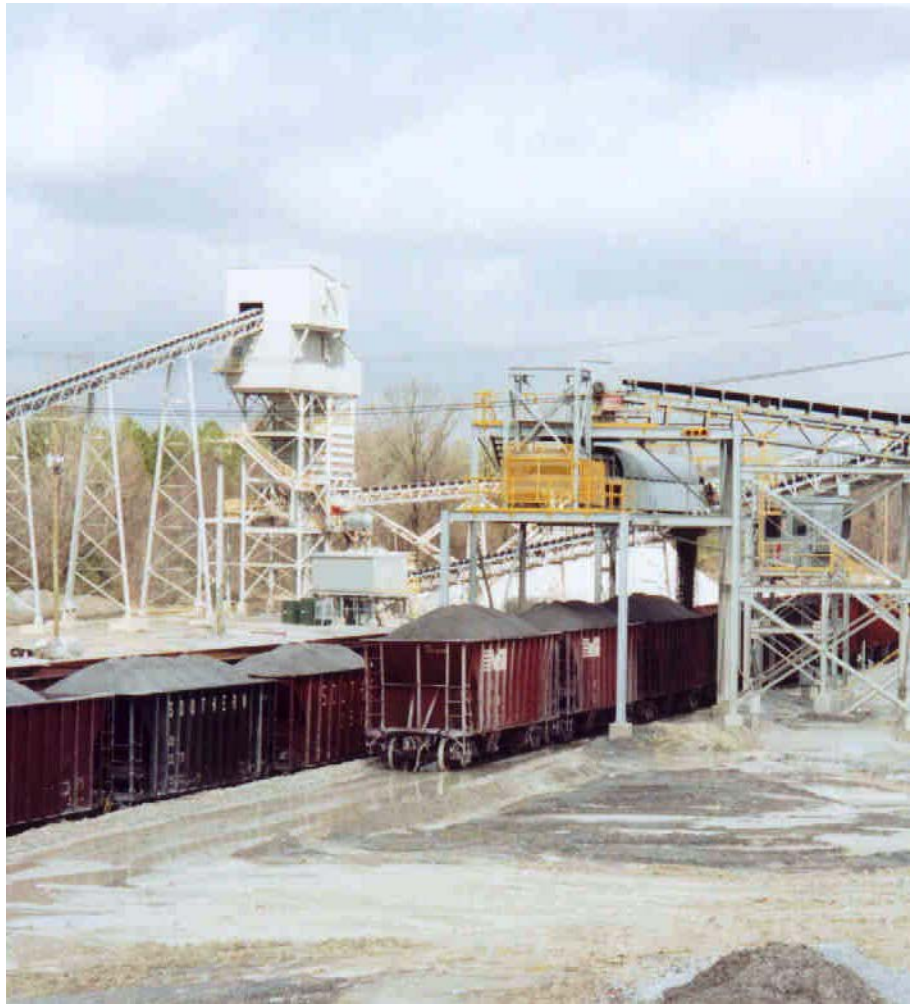
Repeat twice to establish repeatability

Use Span Adjustment, feature to adjust calibration

Perform final test to verify adjustment

Prior to a material test always

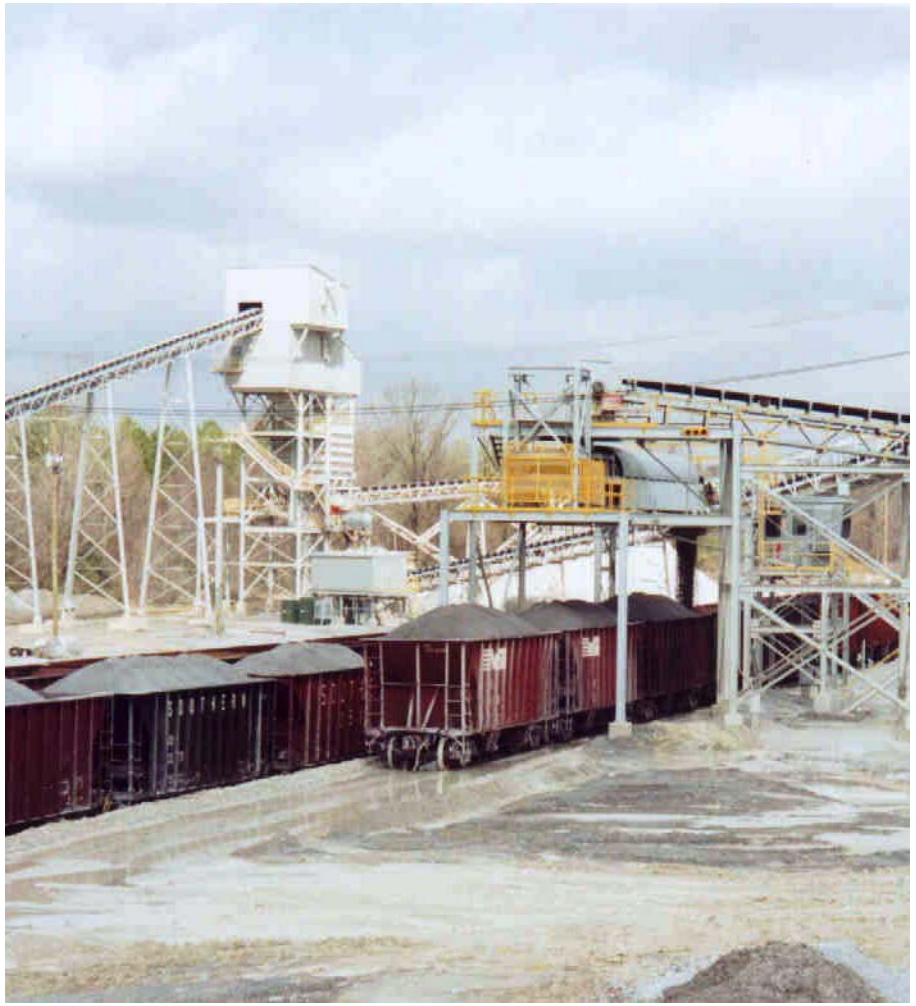
- Verify an accurate tare weigh
- Verify the check scale is functioning properly
- Verify all of the material being weighed on the check scale crosses the belt scale



Belt Scales Basics
Calibration Methods

Material test size

- Totalizer increments
  - ¼% scales, 800 counts
  - ½% scales, 400 counts
  - 1% scales, 200 counts
- Length of test
  - Minimum of 10 minutes or 3 belt revolutions which ever is greater



Typical Applications

Belt Scale Basics

Weighing Technologies
Typical Applications

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Customer

Customer: Industrial sand mine in north Texas
Application: Inventory

Process

After industrial sand is mined it is made into as slurry. This slurry goes through a hydro classifier to separate the different sizes of sand. After the sand goes through the hydro classifier and dewatered it is stored on piles before being sent to the dry side of the processing plant

Challenge

- To properly maintain inventory the sand must be measured as it is added and removed from the sand piles
- The customer needed the scales to measure accurately in the harsh environment of a sand mine with minimum maintenance.

Weighing Technologies
Typical Applications

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Customer

Customer: Grain elevator in southern Idaho
Application: Loadout

Process

In a grain elevator, after the grain is sold it loaded onto railcars to be shipped. It is common practice to load the railcars to 90% of capacity to avoid fines from overloaded railcars.

Challenge

- A grain handling facility loading trucks and rail cars need a way to measure the grain as it is loaded into trucks and railcars
- Railcars leaving the load-out area not fully loaded increased shipping costs
- Maintenance must be minimal because of small maintenance staff

Weighing Technologies
Typical Applications

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Customer

Customer: Large copper mine in eastern Arizona
Application: Productivity measurement

Process

In a copper mine, ore is mined in an open pit. The first step in the process is to reduce the size of the ore to about 6” in diameter using a large cone crusher. The productivity of the mine is based on the number of tons of order produced each day.

Challenge

- Measure the output of the cone crusher to determine the amount of ore produced each day.
- The customer had limited downtime so ease of installation was a requirement.
- The customer required an accuracy of 0.25%.
- Some applications required a capacity of 9000 TPH

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Thank you for your attention

Questions?

Contact

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Answers for industry.

Thank You for Attending Today's Webinar

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Product Manager
Jordan Valve

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